

**ENVIRONMENTAL SERVICES
SPB05-894P-U**

1. PARTIES

THIS CONTRACT, is entered into by and between the State of Montana, Department of Administration, State Procurement Bureau, (hereinafter referred to as "the State"), whose address and phone number are Room 165 Mitchell Building, 125 North Roberts, PO Box 200135, Helena MT 59620-0135, (406) 444-2575 and **PBS&J**, (hereinafter referred to as the "Contractor"), whose nine digit Federal ID Number, address and phone number are 59-0896138, 801 North Last Chance Gulch, Suite 1, Helena MT 59601, and (406) 495-1377.

THE PARTIES AGREE AS FOLLOWS:

2. PURPOSE

The purpose of this term contract is to establish a list of Environmental Service Providers in several service areas. All qualified offerors will be assembled into a multiple contractor term contract for use by state agencies and other public procurement units. The State makes no guarantee of use by any agency-authorized access to this term contract. However, through data conveyed by the Montana Department of Environmental Quality, Montana Department of Natural Resources and Conservation, and Montana Fish, Wildlife and Parks, it is anticipated that this term contract should access approximately 2.5 million dollars or more annually.

3. EFFECTIVE DATE, DURATION, AND RENEWAL

3.1 Contract Term. This contract shall take effect upon execution of all signatures, and terminate on June 30, 2008, unless terminated earlier in accordance with the terms of this contract. (Mont. Code Ann. § 18-4-313.)

3.2 Contract Renewal. This contract may, upon mutual agreement between the parties and according to the terms of the existing contract, be renewed in one-year intervals, or any interval that is advantageous to the State, for a period not to exceed a total of three additional years. This renewal is dependent upon legislative appropriations.

3.3 Addition of Analytical Laboratory Contractor. Proposals will be accepted between April 1 and May 1 of each calendar year from current firms requesting review of their qualifications to perform Analytical Laboratory Services as originally requested under RFP SPB05-894P. The state will evaluate each proposal received in the exact manner in which the original proposals for other categories were evaluated. If proposal passes the requirements as evaluated to perform Analytical Lab Services, the state will update that firms term contract to include the Analytical Lab Services category contingent on said firm being in good standing otherwise.

4. NON-EXCLUSIVE CONTRACT

The intent of this contract is to provide state agencies with an expedited means of procuring supplies and/or services. This contract is for the convenience of state agencies and is considered by the State Procurement Bureau to be a "Non-exclusive" use contract. Therefore, agencies may obtain this product/service from sources other than the contract holder(s) as long as they comply with Title 18, MCA, and their delegation agreement. The State Procurement Bureau does not guarantee any usage.

5. COOPERATIVE PURCHASING

Under Montana law, public procurement units, as defined in section 18-4-401, MCA, have the option of cooperatively purchasing with the State of Montana. Public procurement units are defined as local or state public procurement units of this or any other state, including an agency of the United States, or a tribal procurement unit. Unless the bidder/offeror objects, in writing, to the State Procurement Bureau prior to the award of this contract, the prices, terms, and conditions of this contract will be offered to these public procurement units.

6. TERM CONTRACT REPORTING

Term contract holder(s) shall furnish annual reports of term contract usage. Each report shall contain complete information on all public procurement units utilizing this term contract. Minimum information required to be included in usage reports: name of the agency or governmental entity who contacted you regarding a potential project; project title; agency contact person; if the project was not successfully negotiated, state the reason; number and title of contracts received; total dollar amounts for contracts received; the names of your company personnel involved in the project; and project status as of usage report date. The report for this term contract will be due on July 20th of each year.

Reported volumes and dollar totals may be checked by the State Procurement Bureau against State records for verification. Failure to provide timely or accurate reports is justification for cancellation of the contract and/or justification for removal from consideration for award of contracts by the State.

7. COST/PRICE ADJUSTMENTS

7.1 Cost Increase by Mutual Agreement. After the initial term of the contract, each renewal term may be subject to a cost increase by mutual agreement. Contractor must provide written, verifiable justification for any cost adjustments they request during each renewal period. Contractor shall provide its cost adjustments in both written and electronic format.

7.2 Differing Site Conditions. If, during the term of this contract, circumstances or conditions are materially different than set out in the specifications, the Contractor may be entitled to an equitable adjustment in the contract price. The Contractor shall immediately cease work and notify, in writing, the State of any such conditions necessitating an adjustment as soon as they are suspected and prior to the changed conditions affecting the performance of this contract. Any adjustment shall be agreed upon in writing by both parties to the contract.

7.3 Cost/Price Adjustment. All requests for cost/price adjustment must be submitted between April 1st and April 30th along with written justification. Requests received after April 30th will not be considered unless written approval from the SPB Contracts Officer is given to submit at a later date. In no event will cost/price adjustments be allowed beyond May 15th. All requests that are approved will be incorporated by contract amendment and made effective July 1st of the next approved renewal period.

8. SERVICES AND/OR SUPPLIES

8.1 Service Categories. Contractor agrees to provide to the State the following services:

Water Quality Monitoring – Fixed Station and Probabilistic Design. The statewide monitoring network has three components. The first component is the fixed station water quality-monitoring network. There are 38 fixed station sites located on streams throughout Montana where there are active USGS gauging stations. The USGS is currently contracted to collect all of the water chemistry samples. The State may also collect sediment samples for trace metal analyses. Remote sensing may be used to assess stream geomorphology, flood plain and watershed characteristics.

Water Quality Monitoring - Lakes and Streams. As part of the monitoring program, standards criteria and TMDL development, lakes will continue to be sampled collecting chemistry, physical, and habitat parameters. Stream sampling may include sediment and water chemistry, geomorphology, habitat, or sources of pollutants (e.g., pebble counts, channel cross-section, stream reach assessments, photo points, Rosgen Type II, etc GIS and remote sensing may be used to assess riparian habitats, and watershed physical characteristics.

Water Quality Monitoring - Reference Sites. As part of the monitoring program and standards criteria development, reference sites will continue to be identified and characterized as described above.

TMDL Targets. The TMDL program (within DEQ) will often need additional data in order to develop TMDL targets. Targets are quantitative water quality goals or “endpoints” that represent all the applicable

narrative or numeric water quality standards. These targets, when achieved will represent full beneficial use support. This may require additional monitoring to determine reference condition when TMDL targets are based on narrative criteria or designated uses (water quality standards). Targets may be based on numeric water quality criteria, pollutant concentrations or loads, habitat or geomorphic measures, and/or biological criteria or populations. Targets are also used to determine the existing Water Quality Impairment Status (WQIS) of the streams on the 303(d) list. In most cases, the contractor will be required to write a report, which includes a recommendation and justification for one or more TMDL targets and also compare those targets to the existing conditions to determine WQIS. Communication with the State is crucial while deriving preliminary targets to ensure TMDL consistency across Montana.

TMDL Source Assessment/Delineation. The TMDL program (within DEQ) will often need additional data in order to link water quality impairments to their sources, or to allocate sources of pollutants. This may require data compilation, investigative monitoring and statistical analysis within a specified watershed, which can be used for source allocation, or the linkage of water quality impairments to causes and sources of impairment (e.g., sediment or land use practices). Quantitative source assessments may be conducted using field-based monitoring and/or interpretation and analysis of aerial photos, digital images, or GIS coverages depending upon impairment sources and available information. In most cases, contractors will be required to write a report that identifies what the major causes of impairment are and where the major sources of pollutants are located. DEQ will also need to have all pollution/pollutant sources quantified. The quantification of these loads will assist in both source load allocations and the total maximum daily loads. In addition, data collected during source assessments must be entered into an approved database structure or format and linkage to the National Hydrography Dataset (NHD) streams layer may be requested. The department may also request a cost/benefit analysis for implementing BMPs, which can be used for developing TMDL source allocations. Communication with the State is crucial while deriving assessing sources of pollutants to ensure TMDL consistency across Montana.

TMDL Load Allocations. The TMDL program (within DEQ) will often need additional data in order to develop load allocations in conjunction with the source assessment/delineation. Load allocations are the portion of a receiving water's loading capacity that is attributed to existing or future point or non-point sources of pollution or to natural background sources. Load allocations are best estimates of the loading, which can range from reasonably accurate estimates to gross allotments. Allocation can be expressed as a percent reduction that results in a maximum allowable load or as performance-based, which demonstrates how BMPs will be applied and how they will reduce the current loads. Communication with the State is crucial while deriving preliminary load allocations to ensure TMDL consistency across Montana.

Total Maximum Daily Loads. The TMDL program (within DEQ) will often need additional data in order to develop Total Maximum Daily Loads (TMDLs). A TMDL is defined as the sum of the wasteload allocations to point sources, load allocations to non-point sources and natural background sources with a margin of safety considering seasonal variation. TMDLS can be expresses in terms of mass per time, toxicity, or other appropriate measures that relate to the State's Water Quality Standards. Communication with the State is crucial while deriving preliminary TMDLs to ensure consistency across Montana.

Stakeholder Participation. The TMDL program (within DEQ) will often need additional assistance in order to develop implementation/restoration strategies and monitoring plans. These plans often require public involvement with the local stakeholders. These efforts typically results in developing the measures needed to achieve full beneficial use support or to monitoring the uncertainties that arise during the TMDL process. Offerors should be experienced in or have staff members with proper credentials to facilitate participation with local stakeholders.

TMDL Effectiveness Monitoring. Effectiveness monitoring will be required to evaluate the success of implementing a TMDL plan. Monitoring will often include the collection of some combination of chemical, physical or biological data, which can be used to determine if water quality is improving over time. Most monitoring designs and techniques will be fairly straightforward and may only require visiting a site once per year. In most cases, the contractor will be required to write an annual report, which can be used to determine if water quality is improving.

Geographic Information Systems (GIS) Services. The State, and in particular DEQ, will need assessments that characterize a watershed and identify and quantify all probable sources of pollutants. GIS maps will be required for every waterbody that is assessed. Thematic maps may include, but are not limited to: land ownership, land use, topography, hydrology, soils, precipitation, and/or endangered species distribution. In addition, DEQ may request that GIS applications be used to facilitate the interpretation and analysis of digital images and/or other georeferenced data.

Remote Sensing. The State may consider the use of remote sensing for characterizing a watershed and identifying probable sources of pollutants. For example, indicator metrics may be calculated from an air photo. Metrics may include active channel width, Rosgen level 1 Channel types, % shade, % land use, % land cover, average flood plain width, riparian corridor fragmentation, road density, road crossings, length of irrigation ditch/area, etc. DEQ may request contractors to assist them in developing remote sensing assessment techniques or to employ developed techniques in conducting detailed assessments. All data must be entered into an approved database structure, format, or program and linkage to the National Hydrography Dataset (NHD) streams layer may be requested. If necessary, the Contractor can subcontract in order to acquire the aerial photography products. All subcontractors for this task must be approved by the State prior to initiating a contract.

Water Quality Modeling. The State, and in particular DEQ, uses contracted services in the development and/or application of watershed and water quality modeling tools and techniques in the development of TMDLs. Models may be used to assist in defining TMDL loading allocations, performing existing/potential conditions analysis, watershed scenario analysis, and/or standards attainment analysis. The types of models that may be employed include dynamic watershed loading models (i.e. SWAT, HSPF), water quality fate and transport models (i.e. QUAL2E, QUAL2K), stream temperature and/or shade models (i.e. SSTemp, HeatSource, Shadow), and multi-dimensional lake/reservoir models (i.e. CE QUAL W2). In addition, simpler modeling tools and techniques such as GIS-based Risk Assessment Modeling may be employed or developed based on project needs and resources. The DEQ may also seek assistance in the identification and/or development of simple modeling tools that may be implemented at the desktop that facilitate quick scenario applications. These tools should be able to focus on specific water quality issues such as sediment, nutrients, salinity, etc. and be tailored to the various (eco) regions across the state.

Statistical Analysis. The State may request that large data sets be statistically analyzed for determining trends or for making comparisons. This service area may include data compilation, organization, manipulation and analysis. These analyses may be used to validate environmental targets by comparing reference data to existing data. They may also be used to establish a relationship or linkage between indicators and targets, the estimated loads and how targets link to beneficial use support. Analyses should be appropriate for the type of data being analyzed. In many cases, the contractor will be responsible for determining and providing rationale for appropriate statistical analyses to address pre-formulated environmental hypotheses. Analyses must consider spatial and temporal variations. Analyses may range from providing simple descriptive statistics to reporting multifactor predictive analyses.

Revegetation Services. Revegetation Specialists are utilized by the State and other governmental entities to enhance and complete environmental project tasks. The services offered by Revegetation Specialists are planning, designing, implementation along with providing of supplies, materials and equipment necessary to carryout the tasks. If a firm does not have the staff or equipment to implant a project, they must then be able to demonstrate a plan for delivery of product and implementation of a project through subcontracting or professional cooperative agreements.

Land Use Planning Services. Land use planning services would include Agricultural Land Use, Watershed Land Use or any other land planning services to benefit the state or other governmental entity. The Land Use Planning efforts can include soil analysis, crop recommendations, and irrigation recommendations to assist in developing a beneficial plan for the land in question.

8.2 Reuse of Documents. When the projects dictate a design or engineered approach, the State agrees that it will not apply the Contractor's designs to any other projects.

9. **ENGINEERING ACCESS**

All of the firms selected may need to have access to engineering services depending on the nature of the project. The contractor(s) will be expected to use their own best judgment as to whether engineering services are needed for a given project. However, traditional engineering methodologies are not the emphasis of this RFP. It is a violation of State Statute to practice engineering or land surveying without a license.

10. **PROJECT SELECTION**

10.1 Project Identification. The State will be responsible for identifying projects, contacting landowners and securing necessary permission/cooperation agreements, selecting a contractor, writing grant applications and approving project payments.

10.2 Hazardous Materials. The State will not initiate projects where it is known that hazardous materials are present. If there is an indication of a potential of hazardous materials, then the State will do testing prior to contacting the contractor. However, there is always the possibility of unforeseen problems resulting in the stoppage of a project.

10.3 Meetings. The selected contractor may be required to meet with State personnel at the project site to conduct a site evaluation, discuss project issues and begin the negotiation process on project feasibility, conceptual design and costs for each project.

10.4 Approach Expectations. In the case of restoration activities, the agency will identify the preferred techniques. The determination made by the State may define which contractor(s) are contacted for project initiation. The State is always open to new and innovative approaches that accomplish project goals.

11. **SELECTING A CONTRACTOR**

The State may select a term contract holder from the Environmental Services contract home page as provided under the state's website address

<http://www.discoveringmontana.com/doa/gsd/procurement/TermContracts/environservices/Default.asp>, taking into consideration such things as the contractor's area of expertise, requirements and location of the project, the contractor's availability and access to resources necessary to efficiently and effectively complete the project, demonstrated excellent past performance on State and public projects, identified subcontractors and total project cost.

General. Ordering agencies shall use the procedures in this section when ordering services priced at hourly rates as established by each Term Contract (TC). The applicable service categories are identified in each TC along with the contractor's price lists.

Request for Quotation (RFQ) procedures. The ordering agency must provide an RFQ, which includes the statement of work and limited, but specific evaluation criteria (e.g., experience and past performance), to TC contractors that offer services that will meet the agency's needs. The RFQ may be posted to the agency's state website to expedite responses.

Statement of Work (SOWs). All SOW's shall include at a minimum a detailed description of the work to be performed, location of work, period of performance, deliverable schedule, applicable performance standards and any special requirements (e.g., security clearances, travel, special knowledge).

- (1) Ordering agency may select a contractor from the appropriate service category and directly negotiate a mutually acceptable project based on a sudden and unexpected happening or unforeseen occurrence or condition, which requires immediate action. (Exigency).
- (2) Ordering agency may place orders at or below the \$5,000 threshold with any TC contractor that can meet the agency's needs. The ordering agency should attempt to distribute orders among all service category contractors.

(3) For orders estimated to exceed \$5,000 but less than \$25,000.

- (i) The ordering agency shall develop a statement of work.
- (ii) The ordering agency shall provide the RFQ (including the statement of work and evaluation criteria) to at least three TC contractors that offer services that will meet the agency's needs.
- (iii) The ordering agency shall request that contractors submit firm-fixed prices to perform the services identified in the statement of work.

(4) For orders estimated to exceed \$25,000. In addition to meeting the requirements of (3) above, the ordering agency shall:

- (i) Provide the RFQ (including the statement of work and the evaluation criteria) to a minimum of six service category TC contractors (if category has less than 6, all contractors will be offered an RFQ) with a 50% replacement factor for each subsequent request for quote in the same service category.

Evaluation. The ordering agency shall evaluate all responses received using the evaluation criteria provided in the RFQ to each TC contractor. The ordering agency is responsible for considering the level of effort and the mix of labor proposed to perform a specific task being ordered, and for determining that the total price is reasonable. The agency will place the order with the contractor that represents the best value. After award, ordering agencies will provide timely notification to unsuccessful TC contractors. If an unsuccessful TC contractor requests information on a task order award that was based on factors other than price alone, a brief explanation of the basis for the award decision shall be provided.

Minimum documentation. The ordering agency shall document:

- (1) The TC contractors considered, noting the contractor from which the service was purchased.
- (2) A description of the service purchased.
- (3) The amount paid.
- (4) The evaluation methodology used in selecting the contractor to receive the order.
- (5) The rationale for making the selection.
- (6) Determination of price fair and reasonableness.

Agency project task orders will be utilized to finalize the project. Only written addenda will be used for adjustments of the task orders and must be signed by both parties. All task orders must contain signatures from both parties and appropriate agency legal review as directed in their procurement policy.

The State will monitor contractor selection by using the information provided in the annual TC usage reports.

Contractor's who fail to respond to three RFQ opportunities within a one-year period between July 1st and June 30th may be removed from the qualified list of contractors.

12. CONTRACTOR RESPONSIBILITIES

12.1 Supervision and Implementation. The selected contractor for an individual project will be responsible for the supervision and implementation of the approach and will be responsible for oversight of work performed by all subcontractors. In most cases the contractor will provide and be responsible for all the necessary equipment, materials, supplies and personnel necessary for proper execution of the work. However, the State reserves the right to hire subcontractors (equipment and/or labor) if it will provide a cost savings to the State. The selected contractor will also be responsible for clean up of the sites if necessary and must have the sites inspected by the State immediately prior to completion.

12.2 On-Site Requirements. When a contractor is contacted by the State to discuss a project, the State and the contractor may visit the job site if deemed necessary by the Project Manager, to become familiar with conditions relating to the project and the labor requirements. The State will provide a detailed scope of work for the project and request the contractor supply the State with a response to project approach, cost, timeframe and any other information deemed necessary by the State to make a selection or complete a contract negotiation.

In the cases of Restoration or On-The-Ground Activities, the contractor shall adequately protect the work, adjacent property, and the public in all phases of the work. They shall be responsible for all damages or injury due to their action or neglect.

The contractor shall maintain access to all phases of the contract pending inspection by the State, the landowner, or their representative. All interim or final products funded by the contract will become the property of the State or Cooperative Purchaser upon payment for said products.

All work rejected as unsatisfactory shall be corrected prior to final inspection and acceptance. The contractor shall respond within seven calendar days after notice of observed defects has been given and shall proceed to immediately remedy these defects. Should the contractor fail to respond to the notice or not remedy the defects, the State may have the work corrected at the expense of the contractor.

12.3 Clean Up (when project tasks require). The contractor shall:

- Keep the premises free from debris and accumulation of waste;
- Clean up any oil or fuel spills;
- Keep machinery clean and free of weeds;
- Remove all construction equipment, tools and excess materials; and
- Perform finishing site preparation to limit the spread of noxious weeds before final payment by the State.

12.4 Applicable Laws. The contractor shall keep informed of, and shall comply with all applicable laws, ordinances, rules, regulations and orders of the City, County, State, Federal or public bodies having jurisdiction affecting any work to be done to provide the services required. The contractor shall provide all necessary safeguards for safety and protection, as set forth by the United States Department of Labor, Occupational Safety and Health Administration.

12.5 Cooperation. The contractor shall work closely with the States analytical consultants, (i.e. environmental laboratories and taxonomists) to develop the desired products.

12.6 Work Acceptance. The contractor is responsible for project oversight as needed. The State may also periodically provide personnel for administrative oversight from the initiation of the contract through project completion. All work will be inspected by the State or designated liaison prior to approval of any contract payments. All work rejected as unsatisfactory shall be corrected prior to final inspection and acceptance. Contractor shall respond within seven calendar days after notice of defects has been given by the State and proceed to immediately remedy all defects.

12.7 Records. The contractor will supply the State with documentation, when requested, of methods used throughout project implementation. Contractor will maintain records for themselves and all subcontractors of supplies, materials, equipment and labor hours expended.

12.8 Communication. Remoteness of project sites may necessitate that the contractor have some form of field communication such as a cellular phone. This communication is necessary to enable the State to respond to public concerns related to the project, accidents, inspections, or other project issues that require immediate feedback. In addition, the State or Cooperative Purchaser may require scheduled communication at agreed upon intervals. The communication schedule will be dependent upon the project circumstances and requirements of the contracting agency. In the case when a communication schedule is included in the Scope of Work, the schedule will commence when the contractor initiates the project.

12.9 Change Of Staffing. Since qualifications of personnel were key in determining which offerors were selected to be on this TC, a written notification of any changes in key personnel must be made to the state agency, prior to entering into negotiations to perform any specific work scope. Contractor shall replace such employee(s) at its own expense with an employee of substantially equal abilities and qualifications without additional cost to the agency. If these staffing changes cause the contractor to no longer meet the qualifications stated herein, that firm will be removed from the service area of this TC. Failure to notify the state agency of staffing changes could result in the contractor being removed from the TC listing and possible suspension from bidding on other state projects.

12.10 Collaboration. The State encourages collaboration between contractors to increase the scope of services offered. In cases where the chosen contractor is not able to provide all services needed for the project, the State will expect the chosen contractor to contact other contractors on this list to negotiate subcontracts for these services before going elsewhere. Exceptions to this strategy will be evaluated on a case-by-case basis.

12.11 Subcontractors, Project Budget and Invoicing. All subcontractors to be used in any project must be approved by the authorized entity initiating the project. Project budgets will be negotiated for each individual project contract. However, all rates, terms and conditions set forth in this term contract will be applied to individual contracts. Subcontractor is defined as anyone other than the prime contractor having substantial direct involvement in a specific project.

The State reserves the right to choose the invoicing method from the following:

- Prime contractor's billing will include the subcontractors charges and payment will be made to the prime, or
- Prime and subcontractors will bill the State separately and the State will pay each directly.

13. CONSIDERATION/PAYMENT

13.1 Payment Schedule. In consideration for the services to be provided, the State shall pay according to the negotiated agreement for each project. Hourly rates and miscellaneous charges as provided in Attachment B shall apply.

13.2 Withholding of Payment. The State may withhold payments to the Contractor if the Contractor has not performed in accordance with this contract. Such withholding cannot be greater than the additional costs to the State caused by the lack of performance.

14. CONTRACTOR REGISTRATION

The Contractor will be registered with the Department of Labor and Industry under sections 39-9-201 and 39-9-204, MCA, *prior* to contract execution. The State cannot execute a contract for construction to a Contractor who is not registered. (Mont. Code Ann. § 39-9-401.)

Contractor Registration Number: 53080

15. CONTRACTOR WITHHOLDING

Section 15-50-206, MCA, requires the state agency or department for whom a public works construction contract over \$5,000 is being performed, to withhold 1 percent of all payments and to transmit such monies to the Department of Revenue.

16. MONTANA PREVAILING WAGE REQUIREMENTS

Unless superseded by federal law, Montana law requires that contractors and subcontractors give preference to the employment of Montana residents for any public works contract in excess of \$25,000 for construction or nonconstruction services in accordance with sections 18-2-401 through 18-2-432, MCA, and all administrative rules adopted pursuant thereto. Unless superseded by federal law, at least 50% of the workers of each contractor engaged in construction services must be performed by bona fide Montana residents. The Commissioner of the Montana Department of Labor and Industry has established the resident requirements in accordance with sections 18-2-403 and 18-2-409, MCA. Any and all questions concerning prevailing wage and Montana resident issues should be directed to the Montana Department of Labor and Industry.

In addition, unless superseded by federal law, all employees working on a public works contract shall be paid prevailing wage rates in accordance with sections 18-2-401 through 18-2-432, MCA, and all administrative rules adopted pursuant thereto. Montana law requires that all public works contracts, as defined in section 18-2-401, MCA, in which the total cost of the contract is in excess of \$25,000, contain a provision stating for each job classification the standard prevailing wage rate, including fringe benefits, travel, per diem, and zone pay that the contractors, subcontractors, and employers shall pay during the public works contract.

Furthermore, section 18-2-406, MCA, requires that all contractors, subcontractors, and employers who are performing work or providing services under a public works contract post in a prominent and accessible site on the project staging area or work area, no later than the first day of work and continuing for the entire duration of the contract, a legible statement of all wages and fringe benefits to be paid to the employees in compliance with section 18-2-423, MCA. Section 18-2-423, MCA, requires that employees receiving an hourly wage must be paid on a weekly basis.

Each contractor, subcontractor, and employer must maintain payroll records in a manner readily capable of being certified for submission under section 18-2-423, MCA, for not less than three years after the contractor's, subcontractor's, or employer's completion of work on the public works contract.

The nature of the work performed or services provided under this contract meets the statutory definition of a "public works contract" under section 18-2-401(11)(a), MCA, and falls under the category of Heavy Construction and Nonconstruction services. The booklets containing Montana's 2003 Rates for Heavy Construction and Nonconstruction Services are attached.

The most current Montana Prevailing Wage Booklet will automatically be incorporated at time of renewal. It is the contractor's responsibility to ensure they are using the most current prevailing wages during performance of its covered work.

17. ACCESS AND RETENTION OF RECORDS

17.1 Access to Records. The Contractor agrees to provide the State, Legislative Auditor or their authorized agents access to any records necessary to determine contract compliance. (Mont. Code Ann. § 18-1-118.)

17.2 Retention Period. The Contractor agrees to create and retain records supporting the environmental services for a period of three years after either the completion date of this contract or the conclusion of any claim, litigation or exception relating to this contract taken by the State of Montana or a third party.

18. ASSIGNMENT, TRANSFER AND SUBCONTRACTING

The Contractor shall not assign, transfer or subcontract any portion of this contract without the express written consent of the State. (Mont. Code Ann. § 18-4-141.) The Contractor shall be responsible to the State for the acts and omissions of all subcontractors or agents and of persons directly or indirectly employed by such subcontractors, and for the acts and omissions of persons employed directly by the Contractor. No contractual relationships exist between any subcontractor and the State.

19. HOLD HARMLESS/INDEMNIFICATION

The Contractor agrees to protect, defend, and save the State, its elected and appointed officials, agents, and employees, while acting within the scope of their duties as such, harmless from and against all claims, demands, causes of action of any kind or character, including the cost of defense thereof, arising in favor of the Contractor's employees or third parties on account of bodily or personal injuries, death, or damage to property arising out of services performed or omissions of services or in any way resulting from the acts or omissions of the Contractor and/or its agents, employees, representatives, assigns, subcontractors, except the sole negligence of the State, under this agreement.

20. REQUIRED INSURANCE

20.1 General Requirements. The Contractor shall maintain for the duration of the contract, at its cost and expense, insurance against claims for injuries to persons or damages to property, including contractual liability, which may arise from or in connection with the performance of the work by the Contractor, agents, employees, representatives, assigns, or subcontractors. This insurance shall cover such claims as may be caused by any negligent act or omission.

20.2 Primary Insurance. The Contractor's insurance coverage shall be primary insurance as respect to the State, its officers, officials, employees, and volunteers and shall apply separately to each project or location. Any insurance or self-insurance maintained by the State, its officers, officials, employees or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

20.3 Specific Requirements for Commercial General Liability. The Contractor shall purchase and maintain occurrence coverage with combined single limits for bodily injury, personal injury, and property damage of \$1,000,000 per occurrence and \$2,000,000 aggregate per year to cover such claims as may be caused by any act, omission, or negligence of the Contractor or its officers, agents, representatives, assigns or subcontractors.

20.4 Additional Insured Status. The State, its officers, officials, employees, and volunteers are to be covered and listed as additional insureds; for liability arising out of activities performed by or on behalf of the Contractor, including the insured's general supervision of the Contractor; products and completed operations; premises owned, leased, occupied, or used.

20.5 Specific Requirements for Automobile Liability. The Contractor shall purchase and maintain coverage with split limits of \$500,000 per person (personal injury), \$1,000,000 per accident occurrence (personal injury), and \$100,000 per accident occurrence (property damage), OR combined single limits of \$1,000,000 per occurrence to cover such claims as may be caused by any act, omission, or negligence of the contractor or its officers, agents, representatives, assigns or subcontractors.

20.6 Additional Insured Status. The State, its officers, officials, employees, and volunteers are to be covered and listed as additional insureds for automobiles leased, hired, or borrowed by the Contractor.

20.7 Specific Requirements for Professional Liability. The Contractor shall purchase and maintain occurrence coverage with combined single limits for each wrongful act of \$1,000,000 per occurrence and \$2,000,000 aggregate per year to cover such claims as may be caused by any act, omission, negligence of the Contractor or its officers, agents, representatives, assigns or subcontractors. Note: if "occurrence" coverage is unavailable or cost prohibitive, the Contractor may provide "claims made" coverage provided the following conditions are met: (1) the commencement date of the contract must not fall outside the effective date of insurance coverage and it will be the retroactive date for insurance coverage in future years; and (2) the claims made policy must have a three year tail for claims that are made (filed) after the cancellation or expiration date of the policy.

20.8 Deductibles and Self-Insured Retentions. Any deductible or self-insured retention must be declared to and approved by the state agency. At the request of the agency either: (1) the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the State, its officers, officials, employees, or volunteers; or (2) at the expense of the Contractor, the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claims administration, and defense expenses.

20.9 Certificate of Insurance/Endorsements. A certificate of insurance from an insurer with a Best's rating of no less than A- indicating compliance with the required coverages, has been received by the State Procurement Bureau, PO Box 200135, Helena MT 59620-0135. The Contractor must notify the State immediately, of any material change in insurance coverage, such as changes in limits, coverages, change in status of policy, etc. The State reserves the right to require complete copies of insurance policies at all times.

21. COMPLIANCE WITH THE WORKERS' COMPENSATION ACT

Contractors are required to comply with the provisions of the Montana Workers' Compensation Act while performing work for the State of Montana in accordance with sections 39-71-120, 39-71-401, and 39-71-405, MCA. Proof of compliance must be in the form of workers' compensation insurance, an independent contractor's exemption, or documentation of corporate officer status. Neither the contractor nor its employees are employees of the State. This insurance/exemption must be valid for the entire term of the contract. A renewal document must be sent to the State Procurement Bureau, PO Box 200135, Helena MT 59620-0135, upon expiration.

22. COMPLIANCE WITH LAWS

The Contractor must, in performance of work under this contract, fully comply with all applicable federal, state, or local laws, rules and regulations, including the Montana Human Rights Act, the Civil Rights Act of 1964, the Age Discrimination Act of 1975, the Americans with Disabilities Act of 1990, and Section 504 of the Rehabilitation Act of 1973. Any subletting or subcontracting by the Contractor subjects subcontractors to the same provision. In accordance with section 49-3-207, MCA, the Contractor agrees that the hiring of persons to perform the contract will be made on the basis of merit and qualifications and there will be no discrimination based upon race, color, religion, creed, political ideas, sex, age, marital status, physical or mental disability, or national origin by the persons performing the contract.

23. INTELLECTUAL PROPERTY

All patent and other legal rights in or to inventions created in whole or in part under this contract must be available to the State for royalty-free and nonexclusive licensing. Both parties shall have a royalty-free, nonexclusive, and irrevocable right to reproduce, publish or otherwise use and authorize others to use, copyrightable property created under this contract.

24. PATENT AND COPYRIGHT PROTECTION

24.1 Third Party Claim. In the event of any claim by any third party against the State that the products furnished under this contract infringe upon or violate any patent or copyright, the State shall promptly notify Contractor. Contractor shall defend such claim, in the State's name or its own name, as appropriate, but at Contractor's expense. Contractor will indemnify the State against all costs, damages and attorney's fees that accrue as a result of such claim. If the State reasonably concludes that its interests are not being properly protected, or if principles of governmental or public law are involved, it may enter any action.

24.2 Product Subject of Claim. If any product furnished is likely to or does become the subject of a claim of infringement of a patent or copyright, then Contractor may, at its option, procure for the State the right to continue using the alleged infringing product, or modify the product so that it becomes non-infringing. If none of the above options can be accomplished, or if the use of such product by the State shall be prevented by injunction, the State will determine if the Contract has been breached.

25. CONTRACT TERMINATION

25.1 Termination for Cause. The State may, by written notice to the Contractor, terminate this contract in whole or in part at any time the Contractor fails to perform this contract.

25.2 Reduction of Funding. The State, at its sole discretion, may terminate or reduce the scope of this contract if available funding is reduced for any reason. (See Mont. Code Ann. § 18-4-313(3).)

26. STATE PERSONNEL

26.1 State Contract Manager. The State Contract Manager identified below is the State's single point of contact and will perform all contract management pursuant to section 2-17-512, MCA, on behalf of the State. Written notices, requests, complaints or any other issues regarding the contract should be directed to the State Contract Manager.

The State Contract Manager for this contract is:

Robert Oliver, Contracts Officer
Room 165 Mitchell Building
125 North Roberts
PO Box 200135
Helena MT 59620-0135
Telephone #: (406) 444-0110
Fax #: (406) 444-2529

E-mail: roliver@mt.gov

26.2 State Project Manager. Each using State agency or Cooperative Purchaser will identify a Project Manager in the project task order. The Project Manager will manage the day-to-day project activities on behalf of the State/Cooperative Purchaser.

27. CONTRACTOR PERSONNEL

27.1 Change Of Staffing. Since qualifications of personnel was key in determining which offerors were selected to be on this term contract list, a written notification to the State Procurement Bureau of any changes of key personnel must be made within two weeks of the change. These change notifications will be completed upon the departure or hiring of key personnel who are professional employees critical to awarded service areas. If these staffing changes cause the firm to no longer meet the qualifications stated herein, that firm will be removed from the service area of this term contract. Failure to notify the State Procurement Bureau of staffing changes could result in the contractor being removed from the term contract listing and possible suspension from bidding on other State projects.

27.2 Contractor Contract Manager. The Contractor Contract Manager identified below will be the single point of contact to the State Contract Manager and will assume responsibility for the coordination of all contract issues under this contract. The Contractor Contract Manager will meet with the State Contract Manager and/or others necessary to resolve any conflicts, disagreements, or other contract issues.

The Contractor Contract Manager for this contract is:

Paul Callahan, President
P.O. Box 8254
1120 Cedar Street
Missoula, MT 59807
Telephone (406) 721-0354
Fax 406-721-0355
E-mail paul.callahan@landandwater.net

27.3 Contractor Project Manager. The Contractor Project Manager identified below will manage the day-to-day project activities on behalf of the Contractor:

The Contractor Project Manager for this contract is:

Gary Ingman
P.O. Box 239
801 N. Last Chance Gulch, Suite 101
Helena, MT 59624
Telephone (406) 495-1377
Fax 406-495-1379
E-mail gary.ingman@landandwater.net

28. MEETINGS

The Contractor is required to meet with the State's personnel, or designated representatives, to resolve technical or contractual problems that may occur during the term of the contract or to discuss the progress made by Contractor and the State in the performance of their respective obligations, at no additional cost to the State. Meetings will occur as problems arise and will be coordinated by the State. The Contractor will be given a minimum of three full working days notice of meeting date, time, and location. Face-to-face meetings are desired. However, at the Contractor's option and expense, a conference call meeting may be substituted. Consistent failure to participate in problem resolution meetings two consecutive missed or rescheduled meetings, or to make a good faith effort to resolve problems, may result in termination of the contract.

29. CONTRACTOR PERFORMANCE ASSESSMENTS

The State may do assessments of the Contractor's performance. This contract may be terminated for one or more poor performance assessments. Contractors will have the opportunity to respond to poor performance assessments. The State will make any final decision to terminate this contract based on the assessment and any related information, the Contractor's response and the severity of any negative performance assessment. The Contractor will be notified with a justification of contract termination. Performance assessments may be considered in future solicitations.

30. TRANSITION ASSISTANCE

If this contract is not renewed at the end of this term, or is terminated prior to the completion of a project, or if the work on a project is terminated, for any reason, the Contractor must provide for a reasonable period of time after the expiration or termination of this project or contract, all reasonable transition assistance requested by the State, to allow for the expired or terminated portion of the services to continue without interruption or adverse effect, and to facilitate the orderly transfer of such services to the State or its designees. Such transition assistance will be deemed by the parties to be governed by the terms and conditions of this contract, except for those terms or conditions that do not reasonably apply to such transition assistance. The State shall pay the Contractor for any resources utilized in performing such transition assistance at the most current rates provided by the contract. If there are no established contract rates, then the rate shall be mutually agreed upon. If the State terminates a project or this contract for cause, then the State will be entitled to offset the cost of paying the Contractor for the additional resources the Contractor utilized in providing transition assistance with any damages the State may have otherwise accrued as a result of said termination.

31. CHOICE OF LAW AND VENUE

This contract is governed by the laws of Montana. The parties agree that any litigation concerning this bid, proposal or subsequent contract must be brought in the First Judicial District in and for the County of Lewis and Clark, State of Montana and each party shall pay its own costs and attorney fees. (See Mont. Code Ann. § 18-1-401.)

32. SCOPE, AMENDMENT AND INTERPRETATION

32.1 Contract. This contract consists of 13 numbered pages, any Attachments as required, RFP # SPB05-894P, as amended and the Contractor's RFP response as amended. In the case of dispute or ambiguity about the minimum levels of performance by the Contractor the order of precedence of document interpretation is in the same order.

32.2 Entire Agreement. These documents contain the entire agreement of the parties. Any enlargement, alteration or modification requires a written amendment signed by both parties.

33. EXECUTION

The parties through their authorized agents have executed this contract on the dates set out below.

**DEPARTMENT OF ADMINISTRATION
STATE PROCUREMENT BUREAU
PO BOX 200135
HELENA MT 59620-0135**

**PBS&J
801 NORTH LAST CHANCE GULCH, SUITE 1
HELENA MT 59601
FEDERAL ID # 81-0464439**

BY: _____
Penny Moon, Contracts Officer

BY: _____
(Name/Title)

BY: _____
(Signature)

BY: _____
(Signature)

DATE: _____

DATE: _____

ATTACHMENT A CONTRACTOR'S RESPONSE

3.0 OFFEROR INFORMATION – ALL SERVICE CATEGORIES

The following discussion demonstrates PBS&J's qualifications and experience relative to the service categories that we are competing for under this RFP (**Table 2**). Unless noted otherwise, this information is intended to apply to all of the service categories for which we are making application. More detailed discussion of our qualifications and experience relative to each specific service area is provided in **Section 4.0** of our proposal.

3.1 References

PBS&J has completed dozens of projects within the last five years that are similar or identical in scope to the service categories described in the RFP. In **Table 3** below we are providing project descriptions and client references for a minimum of five example projects for each service category that we are applying for. In accordance with the requirements of RFP, the table provides the client name, location where the services were provided, contact persons, customer's telephone number, a complete description of the service type, and the dates the services were provided.

3.2 Company Profile and Experience

PBS&J Consulting has been in business for 14 years. We are able to perform the desired services in a highly efficient manner and with a minimum of oversight. Some of our many other qualifications are described below.

The PBS&J Team understands the TMDL program, the TMDL development process, the litigation issues, and we are familiar with many of the program staff. We are able to work effectively and efficiently within this framework with no "ramp-up" time or learning curve. We have a full understanding of the Montana Water Quality Act, the Federal Clean Water Act, the Montana Nonpoint Source Management Plan, and the various state and federal TMDL guidance that provide the program framework.

We have created an efficient operational structure for our team, with a project manager and coordinators for each specific service area. DEQ staff will be able to relay service needs directly to our project manager, who is located close by in Helena. Our project manager will be responsible for coordinating tasks, scheduling activities, overseeing operating budgets, providing status reports and ensuring timely delivery of work products to DEQ staff.

We also have a thorough knowledge of past and present water quality improvement efforts in Montana, which will allow us to complete projects with minimal start-up time. We have direct experience in developing TMDLs for a growing number of Montana water bodies. Lastly, we have experience in performing all aspects of water quality monitoring and TMDL development in Montana, and will be available to assume responsibility for directing and completing all phases of comprehensive TMDL projects. As we have demonstrated over the past several years, we are prepared to hit the ground running with regard to the provision of services described in this RFP.

The PBS&J Team can deliver our services with a high level of efficiency because: 1) we have office facilities and staff located around the state (Helena, Missoula, Kalispell, Billings) and can provide decentralized support with reduced travel costs and travel times, 2) our rates are competitive, 3) we have a broad range of technical expertise, work experience, and billing rates and can select the most cost-effective team for any specific task order, 4) we have maintained good working relationships and a high level of credibility with local, state, tribal and federal governments, citizen groups, and businesses and industry, and 5) we have an awareness of opportunities for building local partnerships, leveraging available resources, and for expanding on existing restoration efforts. The value of this latter point should not be underestimated.

We also have an understanding of the cultural hurdles that may exist in some settings relative to water quality improvement efforts. The PBS&J Team has demonstrated a sensitivity to community values and desires, and

team members have proven themselves as effective communicators when working with local watershed groups. This sensitivity will minimize the potential for counter-productive political missteps.

Our team exhibits strong technical qualifications and includes recognized experts in a variety of water quality-related disciplines. We can provide “cutting edge” expertise and advice in many areas of need. Our company and team are known for their innovative approaches and creativity.

The ability to transfer technology and share “lessons learned” will be important in improving efficiency within the Montana TMDL program. PBS&J has practiced a philosophy of documenting all of its work under state task orders. As we have gained experience, developed new methods and built a portfolio of tools, we have documented our efforts and provided DEQ with comprehensive electronic deliverables that can be shared with staff, stakeholders, and other contractors. These deliverables have included all phases of TMDL development and implementation — from pollution source assessments, to water quality target setting, to establishing equitable and scientifically-based pollution allocations, to designing effectiveness monitoring plans—and have covered all types of impairment problems, causes and sources.

PBS&J envisions that it will be able to work with DEQ staff to develop many other creative methods for improving TMDL and statewide monitoring program efficiency and effectiveness, and to extend available budgets. These can include such things as using remote sensing techniques to evaluate TMDL effectiveness relating to silvicultural issues, nuisance algae problems in streams and algal blooms in lakes, and channel morphology, aquatic habitat and water temperature issues. The PBS&J Team is excited about the prospects of continuing a planning dialogue with DEQ staff in this area and would look forward to the opportunity to regularly participate in planning sessions, similar to our recent participation in the EPA/DEQ sediment targets workshop.

As specified in Section 4.1.2 of the RFP, we are providing **Table 4** below which summarizes the years of experience in each of the service categories for which we are applying and other information. The years of experience in each service category represent PBS&J’s company experience and do not reflect the experience of subcontractors or of any of our company staff while employed by other firms. Resumes summarizing qualifications, work experience, education, and skills for each member of our team are provided in **Appendix B** to this proposal. More information on staff qualifications is provided in **Section 3.4** of this proposal. Specific staff assignments for each service category are detailed in **Section 4.0** of this proposal.

Table 4. PBS&J Company Qualifications and Experience by RFP #SPB05-894P Service Category

Service Areas		# Years Service Provided	# Prof. Avail.	Expertise of Professionals and Related Services
Water Quality Monitoring	3.5.1 Fixed Station & Probabilistic Design	12	25	<ul style="list-style-type: none"> • Monitoring network design & statistical optimization • Water chemistry monitoring & assessment • Sediment monitoring & assessment • Benthic macroinvertebrate monitoring & assessment • Periphyton monitoring & assessment (incl. chlor./biomass) • Fisheries & aquatic habitat monitoring & assessment • Fluvial geomorphic assessments (Rosgen, Montgomery, BEHI, Pfankuch, NRCS methodologies) • Riparian assessments (RWRP, PFC, NRCS methods) • Limnological assessments • Wetlands evaluations (USCOE, MDT, and HGM methods) • Reference stream delineation • Remote sensing applications • GIS mapping & analysis • Database management • Data statistical analysis
	3.5.2 Lakes & Streams			
	3.5.3 Reference Sites			
TMDLs	3.5.4 TMDL Targets	12	20	<ul style="list-style-type: none"> • Watershed delineation & characterization • Pollution source assessments & site inventories • Water quality modeling (QUAL2E, BASINS, SNTMP, HEC6) • GIS spatial analysis & remote sensing • Non-point source assessments • Forest roads sediment inventories • Chemical, physical & biological monitoring & assessment • Automated monitoring systems • Pollutant loading quantification • Load & wasteload allocation
	3.5.5 TMDL Source Assessment/ Delineation			

	3.5.6 TMDL Load Allocations			<ul style="list-style-type: none"> • Sediment rating curves • Reference streams delineation • Biocriteria development • TMDL linkage analysis & loading capacities • Literature reviews & data inventories • Monitoring network design • Non-point source controls & BMP audits • WQS attainment evaluations • Advanced data statistical analysis capability • Mapping & spatial analysis • Spatial data management & conversion • Aerial photo interpretation • Aerial remote sensing applications • Sediment/nutrient fate & transport modeling • Stakeholder coordination & facilitation • Public education & participation • Multimedia presentations • Monitoring and assessment training • Volunteer monitoring coordination • Watershed group training in restoration objectives and methods
	3.5.7 Total Maximum Daily Loads			
	3.5.8 Stakeholder Participation			
	3.5.9 TMDL Effectiveness Monitoring			

Table 4 (continued). *PBS&J Company Qualifications and Experience by RFP #SPB05-894P Service Category*

Service Areas		# Years Service Provided	# Prof. Avail.	Expertise of Professionals and Related Services
Technical Support Services	3.5.10 Geographic Information Systems (GIS) Services	12	32	<ul style="list-style-type: none"> • Mapping & spatial analysis • Spatial data management & conversion • Aerial photo interpretation • Aerial remote sensing applications development • In-house pilot for aerial assessments • Load & wasteload allocation • Sediment/nutrient fate & transport modeling • NPDES permit modeling • Water quality modeling (QUAL2E, BASINS, SNTMP, HEC6, BRISTARS, HEC-RAS, HEC-HMS, and numerous others) • Custom models & watershed analyses • Water quality monitoring system development • Monitoring network optimization • Sampling & analysis plans and QAPP's • Water quality status, trends & excursion analysis • Parametric and non-parametric statistical analysis for spatial and temporal analyses • Pollutant loading calculations in lotic and lentic systems • All other monitoring & assessment services described under Service Areas 1 & 2 above
	3.5.11 Remote Sensing			
	3.5.12 Water Quality Modeling			
	3.5.13 Statistical Analysis			
Land Revegetation	3.5.17 Revegetation Services	12	9	<ul style="list-style-type: none"> • Vegetation monitoring (RWRP, PFC, Ecodata Plots, Daubenmire) • Wetland inventory (USCOE Delineation, Functional Assessment) • Revegetation planning (Riparian, upland, and wetland) • Plant material collection (Seed, cuttings, whole plant salvage) • In-house planting crews • Negotiate and manage contract growing • Bioengineering design for streambanks, slumps, gullies
Land Use Planning Services	3.5.22 Land Use Planning Services	12	10	<ul style="list-style-type: none"> • Comprehensive GIS mapping and spatial analysis services • Water rights adjudication (POD and POU analysis) • Instream flow modeling studies and water rights • Water use efficiency studies and modeling of alternatives • Irrigation scheduling and efficiency studies • Crop and integrated pest management • Grazing and riparian management strategies • Spatial modeling of impacts from point and nonpoint sources • Cadastral survey and property ownership
Technical Manuals	3.5.23. Preparation of Technical Manuals or Circulars	10	8	<ul style="list-style-type: none"> • Technical, regulatory and permitting expertise • Graphic production and technical illustrations • Technical editing and proofing • Document layout (Pagemaker, Quark) • In-house color printing of brochures and posters for smaller runs

3.3 Method of Providing Services

We have created an efficient operational structure for our team, with a project manager and coordinators for each specific service area. DEQ staff and others using this contract will be able to relay service needs directly to our project manager, who is located close by in Helena. Our project manager will be responsible for coordinating tasks, scheduling activities, overseeing operating budgets, providing status reports and ensuring timely delivery of work products to agency clients.

We have provided similar support services to Montana DEQ staff and cooperating agencies for the past two years under DEQ contract 202104. Our method of providing these services is described as follows. It follows the approach that has been used for the Jefferson watershed TMDL project beginning in 2003 and continuing to the present (see **Table 3**).

In the case of the Jefferson project, PBS&J was invited to submit a proposal in response to a limited solicitation distributed by the Jefferson River Watershed Council. We were selected for the project, and our proposal became the basis for a project contract. We began the project with an organizational meeting between the PBS&J project manager (Gary Ingman), the Jefferson River Watershed Council (JRWC) coordinator (Roxann Lincoln), and the DEQ 319 grant coordinator and area watershed planner (Darrin Kron). The purpose for the meeting was to finalize the project work plan, timeline and budget, and to obtain a common understanding of project deliverables. Subsequently, the PBS&J project manager attended a regular monthly meeting of the Jefferson River Watershed Council to introduce the PBS&J project team, describe the proposed approach, get acquainted with watershed residents, solicit data and information, and answer questions.

Following the initial meetings, there were additional follow up teleconferences, e-mails and meetings between the PBS&J project manager, the JRWC coordinator, and the DEQ planner to resolve GIS data layers questions and to coordinate completion of a water quality data inventory which was a preliminary project step. The PBS&J team continued work on the project for several weeks and then arranged for a tour of the subject watersheds in the company of local landowners. The purpose for the tour was to interview the landowners about long-term time trends in watershed condition and to gain an appreciation of local perspectives. The PBS&J project manager also worked with the JRWC coordinator to arrange for a meeting with DNRC agency contacts to acquire information on water rights, water uses, and water management practices. The PBS&J project manager also arranged to meet independently with other key individuals to gather data and to conduct interviews.

About two months after project startup, a draft watershed characterization report was delivered to the JRWC coordinator in hard copy and electronic formats. This report was one of four project deliverables. The watershed characterization report was finalized several weeks later following receipt of agency and JRWC review comments. The second set of project deliverables included draft and final water quality impairment status reports. Completion of this second set of reports required a short extension of the original project contract. All parties were in agreement that this was warranted in order to ensure the best possible product. It was recognized that with these types of projects, there are always many unknowns with regard to the amount of data that may be retrieved and the level of intensity of data analysis that may be required. Completion of the second phase of the project proceeded without problems. Following the receipt of limited comments on the draft final report, the water quality impairment status report was finalized and printed. Electronic and hardcopy reports were delivered to the JRWC coordinator, and all of the associated databases, maps and metadata were compiled within an ArcView project and submitted on compact disc. The entire initial project was completed in about six months' time.

In the following months, the PBS&J project manager volunteered his time to attend meetings of the JRWC monitoring workgroup. The purpose of these meetings was to review monitoring recommendations contained in the water quality impairment status report and to develop a monitoring strategy to fill gaps in the available data. In spring 2004, the JRWC solicited a proposal from PBS&J to implement the resulting monitoring plan. PBS&J developed a scope of work, schedule and budget for the project, which was subsequently approved and turned into a contract. A project organizational meeting was once again held, and PBS&J staff followed up by developing a quality assurance project plan (QAPP) and sampling and analysis plan (SAP) to establish monitoring data quality objectives and QA/QC measures prior to the initiation of monitoring. Following approval

of the QAPP/SAP document by the DEQ QA project officer, PBS&J team members commenced field monitoring activities. This project will continue through summer 2004 at which time the interpretive reports and electronic data deliverables will be developed.

PBS&J was invited to develop a third work plan and budget for additional TMDL-related monitoring and assessment activities in the upper Jefferson watershed beginning in mid-2004. This project has also been approved and a project organizational meeting and introductory meeting with JRWC members will be held in late June 2004.

The above project description demonstrates: 1) PBS&J's structured approach to completing task order assignments, 2) PBS&J's effective communication and project coordination skills, 3) its strong commitment to providing high quality work products in the interest of customer satisfaction and repeat business, 4) its sensitivity towards local landowners and watershed stakeholders, 5) its ability to complete projects within required timeframes, and 6) its proven ability to apply appropriate quality assurance measures and to document project quality outcomes.

Example quality assurance project plans and work plans are available upon request from the PBS&J contact person for this proposal, Gary Ingman. Example quality assurance project plans are also available from the Montana DEQ QA officer, Mr. Mark Bostrum.

3.4 Staff Qualifications

This section describes the qualifications of individuals on the PBS&J Team as required by Section 4.1.4 of the RFP. **Table 5** identifies qualified personnel that will be available to work on this contract, their educational credentials, professional registrations, years of experience, and years of work experience on projects similar to those that may be completed under this contract. Full resumes for each team member listed below are presented in **Appendix B**. Information describing staff specialty training applicable to the various service categories is also included in the staff resumes. Detailed information pertaining to project management and key technical staff for each service area is provided in **Section 4.0** of this proposal and complete fee schedules are described in **Section 5.0 and Appendix C**.

Table 5. Summary of PBS&J Staff Education and Experience

Key Personnel	Professional Registrations	Degree(s)	Years Prof. Experience	Years Exp. Similar to Contract
1. Paul Callahan PBS&J, Missoula		M.S. Forestry-Forest Hydrology B.S. Chemistry	17	17
2. Bruce Anderson PBS&J, Missoula		M.S. Forestry-Forest Hydrology B.A. Biology	17	17
3. Charlie Vandam, AICP PBS&J, Missoula	Cert. Planner, Cert. Haz. Mat.	B.A. Geology	20	20
4. Jeff Berglund PBS&J, Helena	Cert. Wetland Scientist, OSHA Cert.	B.A. Biology-Wildlife; minor-Zoology	15	10
5. Gary Ingman PBS&J, Helena		B.A. Environmental Biology	27	27
6. Dan March, P.E. PBS&J, Helena	Reg.Prof. Eng. OSHA Cert.	M.S. Civil Engineering (Hydraulics) B.S. Civil Engineering	11	11
7. Scott Mason PBS&J, Kalispell	Reg. Prof. Geol./Hydro- geologist	M.S. Geochemistry and Mineralogy B.S. Geology and Mineralogy	17.	17
8. John DeArment PBS&J, Missoula		M.S. Env. Studies/Watershed Mgmt. M.A. Political Science B.S. Economics and English	4	4
9. Michelle Arthur PBS&J, Missoula		M.S. Environmental Science B.A. Marine Science	8	8
10. Brandi Steinebach PBS&J, Missoula		B.S. Forestry, minor--Computer Applications	4	4
11. Taylor Greenup PBS&J, Helena		M.S. Earth Sciences B.S. Geography and French	2	2
12. Jeff Dunn PBS&J, Helena		M.S. Environmental Studies B.S. Biology	2	2

13. Brian Parker PBS&J, Missoula		B.S. Forestry, B.S. Geography M.S. Forest Hydrology (Fall 2004)	6	6
14. Martin Oakland PBS&J, Missoula	OSHA Cert.	B.A. Geology	6	6
15. Andrea Pipp PBS&J, Helena	Cert. Lichenologist	M.S. Wildlife Biology, emphasis Botany B.A. Zoology	11	11
16. Stephanie Lauer PBS&J, Missoula	OSHA Cert.	M.S. Forestry/Watershed Man. B.S. Geology	4	4
17. Troy Monroe PBS&J, Missoula	EIT	M.S. Bioresource Engineering B.S. Agricultural Engineering	10	10
18. Greg Howard PBS&J, Missoula	OSHA Cert.	B.A. Botanical Sciences	3	3
19. John Babcock PBS&J, Missoula	OSHA Cert.	B.S. Watershed Management	4	4
20. Laura Lundquist PBS&J, Missoula	Licensed Comm. Pilot	M.S. Mechanical Engineering B.S. Aerospace Engineering	13	13

3.4.1 Individual Qualifications

This section provides a brief description of the key PBS&J personnel as well as subcontractors who will be assigned to work under this contract. Full resumes are included in **Appendix B**.

Gary Ingman is the water quality program leader at PBS&J Consulting and the project officer for this contract. Prior to joining PBS&J, Gary worked for 25 years for the State of Montana on water quality issues. He has an in-depth understanding of Montana's TMDL program requirements and implementation policies, as well as the federal TMDL laws and rules. He helped craft the TMDL amendments to the Montana Water Quality Act in 1997, and administered a DEQ work unit responsible for its implementation. Gary's experience includes watershed monitoring and assessment, restoration planning, and water quality program management. Gary's full-time presence in Helena will allow for an efficient exchange of information between DEQ and the PBS&J Team.

Paul Callahan is a Senior Hydrologist and Principal of PBS&J Consulting. Paul has been involved with TMDLs in Montana since 1996 when he was appointed to the Flathead Lake TMDL technical committee. Since that time, Paul has demonstrated an innovative and pragmatic approach to water quality improvement plans in Montana. He has worked closely with watershed groups (for example, Mineral County, Swan Lake, Little Blackfoot, Ninemile Creek) to enable rural communities to evaluate and improve water quality without unanticipated or unacceptable restrictions. As the author of the *Forest Road Sediment Assessment Methodology*, Paul has presented land management agencies with a useful tool in the quantification and mitigation of road sediment on forest lands. He is currently actively involved in the Bitterroot Headwaters watershed assessment for the Bitterroot National Forest, the Ninemile Watershed Group, and the Swan TMDL effort.

Bruce Anderson is a Senior Hydrologist and Principal of PBS&J Consulting. Bruce has over 12 years of experience at modeling and statistical analysis of water quality data sets in Montana. He manages projects related to stream restoration, channel and fishway design, and surface/groundwater modeling. Bruce is experienced with surface and groundwater network design, sampling, analysis, and modeling. He recently completed a statistical analysis and water quality monitoring plan for the 22,000 mi² Clark Fork-Pend Oreille watershed. CERCLA experience includes arsenic modeling and river channel sediment surveys for the Milltown Site, and sediment transport/peak flow analysis. FERC relicensing projects for Montana Power Company includes studies of heavy metals in Ennis Lake and elsewhere in the Missouri-Madison river system. Bruce also has extensive practical experience in stream, wetland, and riparian restoration, and completed a stream project technical guidance manual for the State of Montana in 1999. Recent projects have included design and construction of stream channels for the FWP, hydraulic structures for state/federal agencies (dam spillways and drop structures, synthetic lined channels, fish ladders, irrigation turnouts, ditch screens, vortex weirs), and bioengineering techniques for streambank restoration.

John DeArment is a Watershed Specialist in Land and Water's Hydrosciences department. He received his B.S. in economics and English at James Madison University and holds an M.S. in Political Science from the

University of Rochester. John is currently putting the final touches on an M.S. in Environmental Studies at the University of Montana, and is a Ph.D. candidate with the University of Montana's School of Forestry.

John is involved in a wide range of projects at Land and Water including vegetation assessment and mapping, wetlands delineation, water quality monitoring and TMDL development, watershed assessment, and stream restoration. John has several years experience as a research assistant with the University of Montana's Riparian and Wetland Research Program where he conducted riparian inventories and watershed assessments, and assisted with stream bank stabilization projects. As part of his graduate studies, he conducted a nutrient and algae study of Montana's Boulder River, and has served as a technical advisor the Northern Plains Resource Council on coal bed methane development in southeast Montana and platinum and palladium mining on the East Boulder River.

Charlie Vandam, a Senior Environmental Scientist/Planner, manages the Environmental Planning and Compliance Department. Charlie has a B.A. in Geology from the University of Montana and is a member of the American Institute of Certified Planners. He oversees all environmental investigation, remediation, and site assessment projects.

Charlie has authored groundwater management plans, wellhead protection ordinances, and floodplain management plans in western Montana. He has developed municipal service/annexation plans for municipalities as well as designed community involvement plans for annexation and Superfund projects. He has been responsible for environmental assessments on over 150 properties throughout western Montana. These assessments and subsequent investigations have included pollution mitigation from mining wastes, industrial wastewater, petroleum fuels, automotive wastes, electrical generating wastes, and agricultural chemicals. Remediation projects have included free-phase product recovery, soil venting, thermal desorption, and hazardous waste disposal.

Taylor Greenup is a Watershed Specialist and GIS Analyst in PBS&J's Helena office. She recently completed her Master of Science degree in Earth Sciences at Montana State University (2003). She has a Bachelor of Science in Geography with French as a second major from James Madison University in Virginia (1996). Her experience includes: stream monitoring; watershed characterization; ground water quality investigations; predictive modeling; invasive plant treatment and inventory; database standardization; and GIS mapping and analysis.

Taylor is currently working on TMDL development and watershed assessment. She has previously worked for the U.S. Forest Service, Montana State University, and the National Park Service. On the Gallatin National Forest, Taylor was involved with water quality monitoring projects on Bear Creek, the Boulder River, and drainages affected by the Fridley Fire of 2001. She helped develop the technical kits for the Forest Service's Burn Area Emergency Response (BAER), teams in regions 1 through 5. Her master's thesis focused on GIS analysis of ground water quality in the Gallatin Local Water Quality District.

Jeff Dunn is a Watershed Specialist working in the Bozeman office of PBS&J Consulting. Jeff graduated with a B.S. degree in Biology from Montana State University and has recently completed work on a M.S. degree in Environmental Studies at the University of Montana. Jeff has also worked as a Research Assistant in the Geology Department at the University of Montana.

Jeff is currently involved in TMDL development and watershed assessment. Jeff has three years of experience working on projects related to watershed health throughout Montana. Specifically, he has worked on the Tobacco River, Milk River, and Clark Fork River near Deer Lodge along with two tributaries, Cottonwood Creek and Marshall Creek. Jeff's graduate thesis examined water quality, channel morphology, and riparian health along the Tobacco River. This study included a restoration design geared toward reducing stream bank erosion and improving water quality within the Tobacco River. Jeff is also experienced in the use of GIS as an analysis tool for stream and watershed assessment projects.

John Babcock is a senior hydrologic technician in PBS&J's Missoula, MT office involved in water quality monitoring, groundwater remediation, stream restoration, fisheries enhancement, hydraulic modeling, and watershed analysis. Since joining PBS&J in 2001, John has operated the water quality monitoring and

assessment program in the Clark Fork of the Columbia River Basin that is described in this paper. Prior to 2001, John worked for the Henry's Fork Foundation and established a long-term monitoring project on the Henry's Fork of the Snake River and its tributaries, and as a field technician for a fisheries consulting firm.

Martin Oakland is a Hydrologist in PBS&J's Surface Water Department. He received his BA in geology / hydrology with an environmental science emphasis from Hartwick College, in Oneonta, NY.

Martin primarily specializes in stream restoration, aquatic habitat enhancement, and watershed analysis. Extensive experience includes all phases of project management, construction oversight, project permitting, budget preparation and design. Channel design expertise includes: hydrological modeling using HEC-RAS and Flowmaster to determine the proper channel geometry and other fluvial relationships, in conjunction with enhanced fish habitat. Recent projects include all levels of permitting (local, state, and federal), design and construction oversight on 28,600 feet of stream restoration and fish habitat enhancement. He also conducts comprehensive watershed assessments in the Lolo, Flathead, Bitterroot, and Clearwater Nation Forests involving 2,098 square miles of watershed, including four different TMDL projects within the last 5 years. Watershed analysis includes 137 miles of channel assessment involving a Rosgen Level II-III survey and USFS R1/R4 fish habitat metrics. Furthermore, Martin has conducted sediment source assessments for 6 major watersheds in Montana and Idaho involving 1,423 miles of forest roads utilizing the Washington Forest Practices Method.

Jeff Berglund is a Senior Wetland Scientist/Wildlife Biologist and manages the PBS&J office in Helena. He is certified as a Professional Wetland Scientist and as a Wildlife Biologist by the Society of Wetland Scientists and the Wildlife Society. He has over 13 years of federal, state, and private sector experience in eight western states, including design and completion of wetland delineations and functional assessments, vegetation and wildlife baseline studies, environmental impact analyses, and mitigation planning and design. Jeff has acquired experience in a wide variety of project contexts, including mining (placer and open-pit gold, coal), pipelines (gas, water, sewer, and crude oil), landfills & hazardous waste sites, subdivisions, highways, timber sales, habitat designation and mapping, and species-specific inventories.

Jeff authored the Montana wetland functional assessment method for MDT and the Montana Interagency Wetland Group, now in use throughout Montana and in several other states. Jeff has prepared biological analyses that include wetland delineation and functional assessment reports, wetland mitigation plans, biological assessments, biological evaluations, and species management plans. He has contributed to biological sections (wetlands, wildlife, vegetation, fisheries) of environmental documents including EIS, EA, environmental impact reports, environmental checklists, and categorical exclusions.

Andrea Pipp has 17 years experience in the fields of Botany and Wildlife Biology. Andrea has worked for the Institute of Ecosystem Studies, Bureau of Land Management, and U.S. Forest Service in seven states. Andrea has extensive experience in identifying vascular plants, bryophytes, lichens, and fungi. Her experience includes: conducting surveys for rare and exotic plants, delineating wetlands, verifying old-growth, developing plant monitoring plans, conducting biological assessments, writing Environmental Assessments and Environmental Impact Statements, teaching botanical courses, and preparing herbarium specimens.

Andrea earned a B.A. in Zoology in 1989 and an M.S. in Wildlife Biology in 1998 from the University of Montana. For her graduate research, Andrea studied the relationship of forest structure and forest age to canopy lichen biomass and species diversity in Washington. Her study has been published in Northwest Science. In July 2001, she completed certification as a Field Lichenologist for Macrolichens of the Pacific Northwest.

Stephanie Lauer is an Environmental Scientist/Hydrologist in both the Environmental Planning and Compliance and Water Resources departments. She has a B.S. in Geology from Northern Arizona University and a M.S. in Forestry (specializing in Watershed Management) from the University of Montana. Stephanie conducts stream assessment and restoration projects, environmental investigations, and remediation and site assessment projects.

Stephanie has over five years of experience and a diverse background in water resources. She has a strong technical background in environmental impact statements, landfill investigations, Phase I, II, and III site assessments and environmental clean-up projects. In addition, Stephanie designed and implemented a study examining instream flow requirements for riparian vegetation communities in Montana, utilizing groundwater and surface water modeling and analysis of the relationship of stream flow, depth to water, and soils on riparian habitat distribution.

Laura Lundquist is an Engineer/Pilot/Environmental Technician in the Hydrology department. She has a B.S. in Aerospace Engineering from Boston University and an M.S. in Mechanical Engineering from the University of Colorado – Boulder. She completed all coursework for a Ph.D. in Genetics and Conservation Biology but decided against a career in academia.

Laura has over ten years experience as a pilot. She flew jets for six years in the U.S. Air Force, and later flew commercial flights for Continental and American Airlines. She has recently flown aerial assessments of the Dearborn, Bitterroot, and Two Medicine/Marias river systems. She has experience in TMDL assessment and modeling, having participated in assessments of the Cut Bank Creek/Two Medicine River system, the Bitterroot headwaters, and the Swift Creek watershed.

Troy Monroe is an Environmental/Bio-Resource Engineer with PBS&J Consulting, Inc. He assists in water quality monitoring and statistical analysis of water quality data. Troy received a B.S. in Agricultural Engineering from the University of Idaho in 1997 and a M.S. in Bio-Resource Engineering from Colorado State University in 1999.

As a Research Assistant with the Department of Chemical and Bio-Resource Engineering at Colorado State University, Troy worked on non-point pollution computer modeling for the Big Thompson Watershed forum. He helped design a groundwater quality monitoring procedure for a local aquifer and implemented GIS to water quality monitoring program.

Recent projects include water quality statistical analysis for the Montana Power Company Missouri-Madison monitoring network, and water quality sampling for the Clark Fork-Pend Oreille monitoring network operated by the Tri State Implementation Council.

Michelle Arthur is a GIS Project Coordinator and is responsible for planning and managing GIS work for PBS&J. In addition to acquiring, creating, and maintaining geographic databases, Michelle is responsible for the maintenance and upkeep of GIS related hardware, software and other related technology. Michelle supervises digitizing and mapping projects, performs spatial analyses, and creates cartographic displays. Recent projects include: soil and weed mapping, watershed inventory and analyses, annexation study in Missoula, environmental site assessments, water conservation plans, mapping for The Nature Conservancy, surface and groundwater monitoring studies and ranch management planning. Prior to joining PBS&J, Michelle worked as a cartographic technician in Glacier National Park, where she assisted park employees with ArcView software, as well as prepared procedural manuals and metadata for park natural resource and GIS data. She also developed and maintained ARC/INFO and ArcView databases, collected and processed GPS data, and designed maps for campgrounds, wildlife monitoring, fire management, vegetation studies, and facilities maintenance.

Scott Mason is a Geochemist/Hydrogeologist for PBS&J's Kalispell office. Scott's projects have focused on water chemistry, sediment and pore water chemistry, fate and transport of metals, water use and water discharge permitting, mining impact assessments, water resource monitoring, and coordination and facilitation of technical and non-technical workgroups. His education includes a B.S. in Geology from the Ohio State University in 1984 and a M.S. in Geochemistry and Mineralogy from Pennsylvania State University in 1987.

Scott has been project manager for many surface water, groundwater, sediment, and geochemical investigations. He has been senior geochemist and quality assurance officer for water resource investigations at numerous mining and smelting sites, including federal and state Superfund sites. Scott is also well versed in federal and state water quality regulations and permitting requirements including Total Maximum Daily Load and Use Attainability Analysis requirements for impaired streams. He has coordinated and prepared NPDES

permits, Nondegradation authorizations (de minimus findings and waivers), Stormwater Discharge permits, Streambed Preservation (310) permits, and Water Right permits for numerous clients. Ongoing projects include assessment of airborne deposition of nutrients to Flathead Lake, source water delineation for public water supplies, fate and transport evaluations for disposal of mine water, statistical assessment of monitoring data from municipal landfills, coordination/facilitation of a local watershed assessment group, and serving as technical team leader for all water-related disciplines during development of an EIS for a proposed mining project.

Dan March is a Hydraulic/Environmental Engineer with PBS&J Consulting, Inc. He holds a M.S. in Hydraulic Engineering from Colorado State University and a B.S. in Civil Engineering from Montana State University.

Dan has eleven years of administrative and consulting experience with governmental and private entities. He has strong applied skills in engineering design, with extensive experience in solving hydrologic and hydraulic analysis/design problems. He also has a comprehensive ability in environmental site assessments and remediation. Computer software capabilities for modeling and design include AutoCAD, Softdesk, TR-55, TR-20, HEC-2, SAM and PLUME. Dan's education and design/construction experience includes: hydrological and hydraulic analysis, stream bank stabilization, stream restoration, erosion control measures, flood control measures, sediment modeling, sediment ponds, stormwater conveyance systems, landfill design and monitoring, hazardous waste investigations, fuel spill investigation and remediation, CECRA, CERCLA, RCRA, RI/FS, and work plan and report preparation.

Dr. David Bennett has over 36 years of experience in the field of fisheries biology. He received his Ph.D. from Virginia Tech. After completing his education, he was hired as an Assistant Professor in the Dept. of Fish & Wildlife, University of Idaho in August 1975 as a warmwater/coldwater fish ecologist and has since remained in that position. Dr. Bennett will be available to provide senior-level advice regarding the impacts of hydropower and other landuse impacts on both warmwater and coldwater fisheries. His extensive background in the linkages between limnological characteristics and fisheries populations will be useful in the development of numerous TMDLs in Montana. During his tenure at the University of Idaho Dr. Bennett has worked in a variety of research areas most notably in large reservoirs affected by hydropower operations. The systems on which he has focused include the Spokane River, Pend Oreille River, Missouri River, and Snake River. He has also completed a number of projects on natural lakes (Lake Pend Oreille, Lake Coeur d'Alene and river systems (Coeur d'Alene tribs). These have been projects with primarily a management need (i.e. effects of operational changes, habitat loss, etc.) associated with warmwater/coldwater fishes, kokanee and westslope cutthroat trout. Some of Dr. Bennett's more recent efforts have involved drawing linkages between the health of fish populations and limnological characteristics of various systems. In summary, Dr. Bennett has had extensive experience in all phases of research and management of lake fisheries.

Ken Knudson For three decades Ken, a fisheries biologist based in Helena, has designed and implemented water quality monitoring programs, including assessments of disturbances to the biological communities of streams and lakes caused by various sources of water quality impairment. As a water pollution control biologist for the Texas and Montana fish and wildlife agencies and while at the Montana Governor's Office, Ken worked directly on updating or revising state water quality standards and policies. He has presented expert witness testimony at congressional, state and public-sponsored hearings regarding water quality standards and maintenance of instream flows. The latter involved helping prepare and defend the MFWP's instream flow reservation requests for the Yellowstone and upper Missouri River Basins. Since 1992, Ken has annually assessed the effects of several large gold mines on the fish, macroinvertebrate and periphyton communities of streams in the Black Hills, South Dakota. Here, several rapid bioassessment protocols/metrics have been used to assess water quality impairment and help determine compliance with water quality goals and criteria.

Dr. C. Michael Falter has been limnologist/aquatic ecologist in the College of Natural Resources, University of Idaho, Moscow, Idaho since 1969. His technical expertise is in the areas of limnology, aquatic ecology, and management of lakes, streams, and reservoirs. Emphasis areas have been aquatic pollution ecology, water impacts (especially land use, mining, and pulp mill impacts), biotreatment, biomonitoring, in-stream effects of pollutants, and primary productivity, especially of aquatic macrophytes and attached benthic algae. He has been principal Investigator of more than 60 research projects on stream ecology and biota in the Columbia and Snake River basins from 1969-2002. Major research areas have been the Snake River (entire length), the mid

Columbia R., Kootenai R., Boise, Wood, Bear, Clearwater, and Payette R. systems, and numerous upland streams throughout the Columbia R. drainage. Dr. Falter has designed and conducted more than 30 limnological projects on lakes and reservoirs of the Snake River drainage. These projects, conducted for a variety of federal, state, and regional entities, have detailed lake limnology, assessed sediment and nutrient loading, and designed lake management plans for long-range optimization of lake uses. Study results in more recent years have generally followed Federal 314 requirements for regional lake management.

Dr. Roland Redmond is the head of the Spatial Analysis Laboratory at the University of Montana. Dr. Redmond has been the principal investigator on over three dozen GIS/remote sensing projects that have studied changes in landuse and resource characteristics over time. Some of his more recent work involves the evaluation of riparian and channel characteristics over large-scale landscapes for the Forest Service in Montana. It is envisioned that Dr. Redmond will be a key participant in discussions with DEQ on the development of feasible and cost-effective remote sensing methods to identify and characterize both reference and impaired reaches over larger scales. In addition, Dr. Redmond's experience and capabilities will be useful in the quantification of historical timber harvest activities when accurate records are nonexistent or difficult to compile.

Dr. Steve Running is the president and founder of Terradynamics in Missoula. Terradynamics specializes in the application of satellite remote sensing and ecosystem modeling tools, providing solutions in natural resources management. The state-of-the art tools developed by Dr. Running and his colleagues help, not only to map changes in land surface conditions, but also to estimate the impacts of such changes on water yield, quality, etc. Terradynamics has experience in using a wide variety of satellite data to address natural resource management issues from local to regional scales. Combining satellite data with climate and soils data sets in a biophysical modeling framework allows us to produce estimates that can be verified with point observations. Once tested, the models then can be used in a predictive mode allowing resource managers to gain a better understanding of the likely scenarios as a result of changes in land cover or climate.

Table 6 shows the organizational structure for technical coordination of each of the 17 service areas described in the RFP for which PBS&J is applying. More detail on the personnel to be utilized within each of these service areas is described below and represented graphically in **Figures 1a-1k**.

Table 6. Technical Coordinators for Each RFP #SPB05-894P Service Category

	Technical Service Areas	Technical Coordinator	Figure Showing Detailed Organizational Structure
Water Quality Monitoring	Fixed Station & Probabilistic Design	Gary Ingman	Figure 1a
	Lakes & Streams	Gary Ingman	Figure 1a
	Reference Sites	Gary Ingman	Figure 1a
TMDL	TMDL Targets	Gary Ingman	Figure 1b
	TMDL Source Assessment/Delineation	Gary Ingman	Figure 1b
	TMDL Load Allocations	Gary Ingman	Figure 1b
	Total Maximum Daily Loads	Gary Ingman	Figure 1b
	Stakeholder Participation	Gary Ingman	Figure 1c
	Effectiveness Monitoring	Gary Ingman	Figure 1d
	Geographic Information System Services	Michelle Arthur	Figure 1e
Technical Support Services	Remote Sensing	Paul Callahan	Figure 1f
	Water Quality Modeling	Bruce Anderson	Figure 1g
	Statistical Analysis	Bruce Anderson	Figure 1h
	Revegetation Services	Andrea Pipp & Dan March	Figure 1i
Land Use Planning Services	Land Use Planning Services	Charlie Vandam	Figure 1j
Technical Manuals	Preparation of Technical Manuals & Circulars	Bruce Anderson	Figure 1k

4.0 OFFEROR INFORMATION – SPECIFIC SERVICE CATEGORIES

This section of our proposal describes our qualifications and specific project experience for each of the RFP service categories that PBS&J is competing for.

4.1 Water Quality Monitoring – Fixed Station and Probabilistic Design

The PBS&J Team includes professionals located in Helena, Bozeman, Missoula, and Kalispell. Our team of monitoring specialists and trained technicians are available to perform statewide monitoring activities with minimum travel requirements. We have established working relationships with analytical laboratories located

in Helena, Billings and Kalispell and can arrange for analysis of samples with short holding times, such as soluble reactive phosphorus and fecal coliform. We maintain a full suite of state-of-the-art monitoring equipment, including portable multi-meters, a Hydrolab unit, filtration devices, a variety of pumps, well monitoring equipment, flow meters, flumes, survey grade GPS units, and other equipment.

PBS&J Team members are among the most respected scientists in Montana in the fields of aquatic ecology, fisheries science, hydrology, environmental statistics and data analysis, and surface water monitoring and assessment. The PBS&J Team has extensive experience in all aspects of fixed station monitoring, including monitoring network design, budgeting, data collection and analysis, database development and management, data interpretation and reporting. Projects that we have completed that demonstrate our ability to design and implement fixed station and probabilistic monitoring programs include:

- ***Bitterroot Headwaters Water Quality Study*** – Following the wildfires of 2000, the Montana DNRC contracted with PBS&J to perform water quality sampling on the Sula State Forest in the Bitterroot headwaters area. Our technicians are monitoring for suspended sediment, nutrients, discharge and temperature at a series of fixed stations from early spring through the summer period. This project is ongoing.
- ***Tri-State Water Quality Council, 1996-present*** – PBS&J was hired to design a statistically rigorous, goal-oriented monitoring program for the Clark Fork Pend-Oreille Basin in the states of Montana, Idaho and Washington. PBS&J was contracted to operate the program for the Tri-State Council, beginning in 1998. Activities have included monthly monitoring at a network of 26 sites, bi-weekly summer compliance monitoring, maintenance of a database, development of annual monitoring reports, and periodic statistical analysis for time trends.
- ***Big Blackfoot Watershed Monitoring Framework, 2002*** – The purpose of this project was to perform a comprehensive appraisal of water quality monitoring needs in the Blackfoot watershed and to make recommendations for establishing a tiered monitoring approach by building on existing agency monitoring efforts. The project began with a review of agency and citizen group management goals for the watershed, followed by an inventory past and ongoing monitoring activities and sampling locations. A series of monitoring goals and objectives were established for each of several planning units in the Blackfoot Basin and specific monitoring needs were tabulated. Detailed and general recommendations were provided for implementing an improved cooperative monitoring program in the Blackfoot Basin.
- ***Big Blackfoot Watershed Water Quality Status and Trends Monitoring Program, 2003*** – This project provided a detailed design for establishing a comprehensive long-term basin-wide water quality status and trends monitoring network for the Big Blackfoot River and selected tributaries. The monitoring plan built on recommendations provided in the previous reference, and included the delineation of responsibilities, an operating plan and budget, and development of a quality assurance project plan which was subsequently approved by U.S. EPA and MDEQ.
- ***Stillwater and East Boulder Rivers Biological Monitoring Program Optimization, 2002-2004*** – PBS&J was retained by Northern Plains Resource Council and other citizens' groups to review and critique a water quality and biological resources monitoring program for the Stillwater and East Boulder rivers near the Stillwater Mining Company's Nye and East Boulder project sites. Monitoring plans, and an associated tiered trigger level framework for addressing potential water quality excursions, was evaluated for its ability to protect beneficial water uses and biological integrity in the watershed. Suggestions were presented for improving water quality trend detection capabilities of the program, and for revising trigger levels for nutrient variables. Additional reports were developed in 2003 and 2004 that interpreted biological monitoring results and provided recommendations for optimizing the monitoring programs.
- Our environmental services program manager, Gary Ingman, helped design and implement a statewide biological monitoring network in the early 1980s to evaluate water quality conditions and trends at a series of representative, fixed-stations in all of Montana's major river basins. During this same period, he operated a network of fixed monitoring stations in the upper Clark Fork designed to monitor the

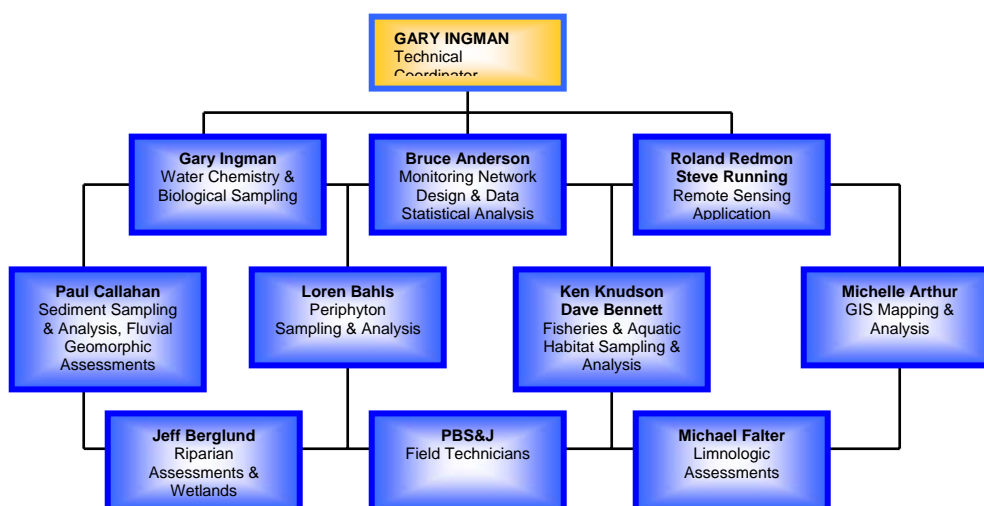
residual effects of historical mining activities on water quality. In the mid-1980s, he developed and operated a fixed-station program on the Clark Fork and its tributaries from above Missoula to the Idaho border for purposes of developing an environmental impact statement on a kraft paper mill. In 1986, he designed and operated a basin-wide, fixed-station chemical, physical and biological water quality monitoring program on 350 miles of the Clark Fork River, and its tributaries, from Butte to Idaho. This program continued until 1996. From 1988-1992, he conducted additional Clark Fork Basin fixed-station monitoring to assess sources of nutrient loading to the river, as required by 1987 amendments to the federal Clean Water Act.

Figure 1a shows the key personnel that will be assigned to work on tasks in this technical service area. PBS&J has a full staff of highly qualified technicians available to conduct routine sampling in areas served by our offices in Helena, Bozeman, Missoula, and Kalispell. All of our monitoring staff members have at least a bachelor's degree in a natural sciences field.

To ensure data quality, we will implement a rigorous quality assurance/quality control program that involves annual training and oversight by senior-level professionals. Training for specific sampling protocols will be conducted by Gary Ingman (water chemistry), Paul Callahan (sediment and geomorphology), Jeff Berglund (riparian and wetlands) and Ken Knudson (fish and aquatic habitat). All monitoring projects will include the development of quality assurance project plans and detailed sampling and analysis plans, an area in which PBS&J has demonstrated its competence. PBS&J's remote sensing expertise that may be applied to this service area is described in Section 4.11 of this proposal.

Gary Ingman will serve as team leader, technical coordinator and agency liaison for purposes of fixed-station and probabilistic monitoring design and implementation activities.

Figure 1a. Organizational Structure for Water Quality Monitoring, including Fixed Station and Probabilistic Design, Lakes and Streams, and Reference Sites



4.2 Water Quality Monitoring – Lakes and Streams

PBS&J monitoring specialists that will be responsible for implementing tasks under the fixed-station monitoring technical service area will also be available to apply their expertise in the assessment of targeted or randomly selected stream reaches. Specific areas of expertise included within the PBS&J Team are:

- macroinvertebrate sampling,
- periphyton sampling (community structure, algal biomass, chlorophyll), fisheries and fish habitat appraisal,
- fluvial geomorphology,
- riparian and aquatic habitat assessments,
- water and sediment chemistry,
- limnology/lakes assessments,
- wetlands evaluations.

Our team includes a full staff of hydrologists, biologists, botanists, and remote sensing/GIS specialists that will be available as needed. Our team of well-trained and experienced environmental technicians ensures that we are able to perform all monitoring and assessment work in a cost-effective manner. All of our monitoring staff members have at least a bachelor's degree in a natural sciences field.

PBS&J has successfully completed comprehensive, watershed-scale geomorphic assessments on the following streams and rivers in Montana within the last five years:

- Little Blackfoot River
- Swan River
- Ninemile Creek
- Fishtrap Creek
- West Fork Thompson River
- Rock Creek
- Bull River
- St. Regis River and tributaries
- Lake Helena Watershed Streams
- Trout Creek (tributary to Lower Clark Fork)
- Trout Creek (tributary to Flint Creek)
- Warm Springs Creek
- Bitterroot River
- Camp Creek (tributary to East Fork Bitterroot)
- Kleinschmidt Creek (tributary to North Fork Blackfoot)
- Broadwater County Streams (Greyson, Dry, Dry Hollow, Sixmile)

PBS&J has performed recent, smaller-scale stream reach assessments on over two-dozen other streams and rivers. Collectively, PBS&J Team members have performed water body or watershed assessments in nearly all of Montana's major river basins during the last two decades.

Gary Ingman will be the technical coordinator for the Lakes and Streams water quality monitoring service area. Gary has conducted or directed stream reach and watershed/water body assessments throughout Montana and is intimately familiar with the established DEQ stream reach assessment procedures. Gary will also draw from the expertise of Paul Callahan, who has conducted geomorphic analysis of over 600 miles of Montana streams and rivers ranging from the Tongue River to the North Fork of the Flathead. Paul has extensive experience with the most accepted assessment methodologies currently in use. These include Rosgen stream classification, Hankin and Reeves aquatic habitat inventory methods, and the Forest Service R1/R4 stream reach assessment method.

PBS&J stream reach assessment services would be delivered according to the organizational structure shown in **Figure 1a**. The skills mix contained within this team covers all facets of chemical, physical and biological monitoring and assessment of surface waters.

As with the fixed station monitoring, PBS&J can make use of our team of technicians to conduct routine sampling. Our geographic coverage and mix of skills will allow for the most cost effective approach to monitoring and assessment work activities. To ensure data quality, we will implement a rigorous quality assurance/quality control program that involves annual training and oversight by senior-level professionals and preparation of quality assurance project plans. Training for specific sampling protocols will be conducted by Gary Ingman (water chemistry, benthic macroinvertebrates, periphyton, and chlorophyll), Paul Callahan

(sediment and geomorphology), Jeff Berglund (riparian and wetlands) and Ken Knudson (fish and aquatic habitat). Gary Ingman will serve as team leader, technical coordinator and agency liaison for purposes of stream reach assessments.

4.3 Water Quality Monitoring – Reference Sites

The survey of reference sites may involve similar procedures to those used in the two previous technical service areas (fixed station monitoring and lakes and streams). As such, the PBS&J Team is well qualified to perform this type of monitoring. Perhaps the largest challenge lies in identifying suitable “least-impaired” reference streams (or stream reaches) so that the resulting data can be applied with confidence to establish water quality restoration goals or to set benchmarks for assessing water quality conditions in other less pristine water bodies.

The PBS&J Team is particularly well equipped to assist the agencies with the selection of suitable reference stream locations. Our team has extensive experience evaluating aquatic systems throughout Montana. We have studied lakes, rivers and streams, and wetlands for a wide variety of parameters and problem types. We have a very good understanding of the predominant causes and sources that may impair water quality and biological integrity in any particular region of the state. Our expertise and technical resources in the areas of GIS and aerial remote sensing can be applied very effectively to evaluate land-use impacts, degree of development, and other factors in candidate reference watersheds. Ecological impairment, which may not be evident from land-use or local habitat conditions, can then be gaged by our experienced biologists.

The PBS&J Team has considerable experience in establishing and monitoring Montana reference streams. Gary Ingman participated in Montana’s first effort to establish and document conditions at a statewide network of least-impaired reference water bodies. Our team members have successfully applied the use of reference stream concepts in the Clark Fork biological monitoring program, in the Tri-State Water Quality Council monitoring effort, and in other recent water body assessment work such as the Little Blackfoot River project. Our project manager is well versed in DEQ’s application of reference streams information in the TMDL beneficial use-support determination procedure, and in TMDL effectiveness monitoring programs.

The organizational structure for this technical service area is also shown in **Figure 1a**. As with the fixed station monitoring and lake and stream monitoring, PBS&J can make use of our team of technicians to conduct routine sampling. Our geographic coverage and mix of skills will allow for the most cost-effective approach to monitoring and assessment. To ensure data quality, we will implement a rigorous quality assurance/quality control program that involves annual training and oversight by senior-level professionals. Training for specific reference streams sampling protocols will be conducted by monitoring specialists Gary Ingman (water chemistry, macroinvertebrates, periphyton), Paul Callahan (sediment and geomorphology), Jeff Berglund (riparian and wetlands) and Ken Knudson (fish and aquatic habitat). Gary Ingman will serve as team leader, technical coordinator and agency liaison for purposes of reference site monitoring and selection. Please note that all of our monitoring staff members have at least a bachelor’s degree in a natural sciences field.

4.4 TMDL Targets

PBS&J personnel have completed numerous projects that involved setting TMDL water quality restoration targets for Montana water bodies. We have team expertise in identifying suitable reference streams and in establishing reference conditions for TMDL targets based on narrative criteria and designated water uses. Our staffs have a strong working knowledge of the Montana water quality standards, and numeric water quality criteria. We are familiar with alternative methods for computing pollutant loads, and have strong expertise in fluvial geomorphic criteria. Our team includes biologists with experience in biocriteria development and their application as water quality targets.

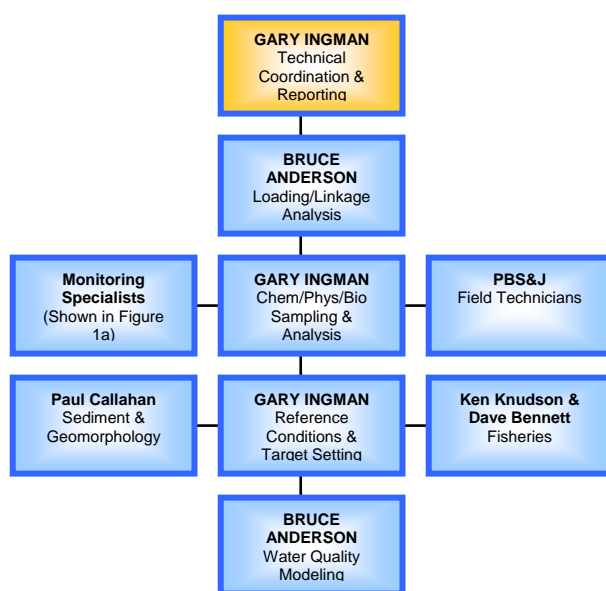
Our team project experience in setting primary and supplemental water quality restoration targets includes:

- Twelve Mile Creek TMDL (sediment targets),
- St. Regis Watershed (sediment, temperature and habitat targets),
- Lake Helena Watershed (sediment targets),

- Cut Bank-Two Medicine Watershed (salinity, sediment, temperature, nutrients)
- Lolo Creek (sediment targets),
- Swan River (sediment targets),
- Montana-Idaho border agreement for the Clark Fork River (nutrient targets),
- Clark Fork River voluntary nutrient reduction program (nutrient targets), and
- Teton River (salinity targets).

Gary Ingman will be the coordinator and primary contact for DEQ in this technical service area. **Figure 1b** shows the key personnel to be involved in this project. The development of water quality targets requires knowledge of the natural potential of water bodies and an understanding of the linkages between pollution sources and their effects, and between various physical and chemical attributes and biological health. Our team has the diversity of skills to fully incorporate these concepts into the development of water body-specific TMDL targets.

Figure 1b. Organizational Structure for TMDL Development Support Services, including TMDL Targets, Source Assessments, Load Allocations, and Total Maximum Daily Loads



Dr. Michael Falter will be available to advise DEQ on the development of targets relating to lake water quality and Dr. Dave Bennett will be available to provide expertise on physical-biological linkages for both warmwater and coldwater fisheries. Paul Callahan has worked closely with DEQ, Plum Creek Timber Company, DNRC, the Forest Service and other stakeholders to develop sediment targets for Twelvemile Creek TMDL, Upper Lolo Creek TMDL, and seven TMDLs in the Swan watershed.

4.5 TMDL Source Assessment/Delineation

Delineation of pollution sources, to establish cause-and-effect relationships in impaired water bodies and to allocate pollutant loads, can be approached in a variety of ways. PBS&J has the tools and expertise to assist DEQ with pollution source delineation studies, whether through conventional field-based methods or with alternative approaches such as modeling, GIS or remote sensing applications. We have demonstrated our competence in this service area with several recent TMDL projects which address point as well as nonpoint source pollution.

Our hydrologists are experienced in the quantification of sediment and nutrient loading from forest management and agricultural activities, and at a variety of hydrologic scales. In addition, we have completed numerous modeling projects that have led to validated, comprehensive source delineations and pollution allocations. We have conducted abandoned mine-related pollution source delineations in several watersheds, and developed a watershed-wide delineation of nutrient sources in the 21,000 square mile Clark Fork Basin.

Some of our recent pollution source delineation project work includes:

- Swan River TMDL sediment source delineation,
- St. Regis watershed sediment, thermal and habitat impairment source assessment,
- Lake Helena watershed sediment, metals, nutrients, and thermal source assessment,
- Cut Bank-Two Medicine sediment, salinity, nutrients, and thermal source assessment,
- Clark Fork VNRP nutrient source modeling,
- Little Blackfoot River physical features inventory and riparian assessment,
- Ninemile Creek geomorphic analysis and aquatic habitat assessment,
- Lolo Creek road sand impact assessment,
- Bitterroot watershed analysis, and
- Highway 12 road sand analysis.

The recent Lake Helena watershed pollution source assessment combined results from a field visual survey, field monitoring for chemical, physical, and biological water quality variables, and an aerial photo assessment. The field visual survey was conducted at the screening level with the aid of a data dictionary, GPS, and digital camera. The field survey resulted in a GIS source layer with an associated photo library and accompanying maps. Also included in the source assessment were relevant field observations and sampling results from the 2003 monitoring effort. Another main element of the source assessment was an aerial photo inventory. Current stereo-pair aerial photos from the USFS and MDT were analyzed for channel characteristics and pollution sources. A GIS project aided the photo assessment with the use of digital 1:24,000-scale USGS topographic maps, one-meter resolution orthophoto quadrangle maps, and potential source layers such as roads and abandoned mines.

Gary Ingman will be the primary agency point of contact for the source assessment technical service area. Gary will work with clients to bring together the appropriate mix of skills for each unique watershed planning unit. Included on our team are specialists in all aspects of source identification and quantification. Areas of expertise include various types of water quality monitoring, watershed assessment, water quality modeling, and GIS and remote sensing-based land use analysis (**Figure 1b**).

Roland Redmond and Michelle Arthur will be the remote sensing and GIS coordinators, respectively. Roland and Michelle have completed numerous projects involving the temporal analysis of land use and vegetation (see **Section 4.10**). With the use of GIS and remote sensing, water quality and landscape changes can be evaluated over larger scales and longer time frames. Roland and Michelle will be available to assist the agencies in the development of innovative and cost-effective analysis methods.

PBS&J staff members have extensive experience in water quality modeling and pollution source delineation projects. In many cases, as with larger water bodies or water bodies lacking monitoring data, modeling can provide a reasonable approach to identifying pollution sources and allocating loads (see **Section 4.12**).

Paul Callahan will lead nonpoint sources assessment and delineation efforts for our team. Paul has worked on watersheds throughout Montana to evaluate the impacts of grazing and forestry activities on water quality. He has developed practical and innovative approaches to assessing forest road sediment yields and has implemented those techniques on over 1,200 miles of roads in Montana in the last five years.

4.6 TMDL Load Allocations

Approaches for establishing pollutant allocations within TMDLs are largely dependent upon the pollution source assessment methodologies and results. The pollutant allocations and restoration measures become the basis for a water quality restoration strategy, which may include a combination of non-point and point source pollution control measures. Montana has adopted a policy of voluntary compliance for addressing non-point sources of pollution emanating from private lands. As a result, non-point source control measures rely heavily on public education and other programs that encourage private landowners to apply appropriate land, soil and water conservation practices. Point source pollution is regulated through a state-administered discharge permit program, and any point source allocations that are included in the restoration plan will become a mandatory component of the discharge permits.

PBS&J staff have perfected a number of methods for quantifying pollutant loads on a watershed or sub-watershed scale, and for allocating pollution controls on the basis of land use, geographical area, land ownership, or other specific pollution source category. These include direct measurements described in Section 4.5, remote sensing (Section 4.11), various modeling approaches (Section 4.12), and performance based approaches and adaptive management.

Gary Ingman will be the primary agency point of contact for the pollution allocation step of the TMDL development process. Gary will work with clients to bring together the appropriate mix of skills for each unique situation. Included on our team are specialists in all aspects of source identification, quantification, allocation and restoration planning. These are described in more detail in the sections that follow.

The organizational structure for this service area is shown in **Figure 1b**.

4.7 Total Maximum Daily Loads

The technical definition of TMDL is the sum of load allocations plus waste load allocations plus a factor of safety. It is also the total amount of pollutant that a stream may receive from all sources without exceeding water quality standards. A TMDL may also be defined as a reduction in pollutant loading that results in meeting water quality standards. PBS&J staff members have considerable experience in selecting and articulating appropriate expressions of TMDLs for nutrients, sediment, salinity, water temperature, and heavy metals. The process of establishing TMDL equations draws heavily from the various disciplines and expertise represented within the PBS&J Team and described in previous and following sections.

PBS&J staff members have completed, or nearly completed, TMDL expressions for the Swan watershed (nutrients, sediment), Twelvemile Creek (sediment), upper Lolo Creek (sediment), St. Regis watershed (sediment, temperature, habitat), Cut Bank-Two Medicine watershed (salinity, sediment, nutrients), and others. The organizational structure for this service area is shown in **Figure 1b**.

4.8 Stakeholder Participation

PBS&J has developed most TMDL assessments and restoration plans with active participation by local residents and watershed stakeholders. As such, we are well versed in communicating complex technical themes to lay audiences. We also have substantial in-house expertise in the area of group facilitation and in coordinating complex watershed projects with multiple agencies and interest groups. All of our project managers and staff scientists identified in **Figure 1c** below are capable of providing public facilitation services and are effective communicators.

Some recent project examples where PBS&J staff have participated in or lead local stakeholder participation in watershed projects include:

- Cut Bank-Two Medicine TMDL (local conservation districts)
- Lake Helena TMDL (technical and policy advisory committees, local watershed groups and conservation districts)
- St. Regis TMDL (technical advisory committee and general public involvement)
- Jefferson TMDL (local watershed group and conservation district)
- Tri-State Council monitoring program (technical work group and general membership)
- Swan TMDL (local citizens' group and conservation district)
- Little Blackfoot TMDL (local watershed group, conservation district)

Figure 1c depicts our proposed organizational structure for TMDL stakeholder participation services.

Figure 1c. Organizational Structure for Stakeholder Participation



4.9 TMDL Effectiveness Monitoring

The TMDL effectiveness monitoring requirements of the Montana Water Quality Act present a considerable challenge because each completed TMDL will need to have a monitoring program developed, implemented and maintained for at least five years. Thus, these monitoring plans will need to be highly efficient, cost-effective and minimally burdensome on staff. The PBS&J Team has extensive experience in designing and implementing optimally efficient, goal-oriented monitoring plans for purposes of evaluating management plan effectiveness and water quality compliance.

PBS&J designed and operates the Clark Fork-Pend Oreille monitoring program for the Tri-State Water Quality Council. This program evaluates the effectiveness of a three-state nutrient management plan, as well as the Clark Fork voluntary nutrient reduction program. PBS&J recently critiqued and helped improve a monitoring program that was intended to evaluate the effectiveness of an operating agreement in preventing water quality degradation downstream from a major hard rock metals mine. Our staffs have also designed monitoring programs for evaluating effectiveness of nonpoint source demonstration projects, and for assessing the water quality benefits of Superfund cleanup measures. In all cases, a full range of chemical, physical and biological monitoring alternatives were considered and the selected design was tailored to the available budget and the desired information product(s).

Our project manager, Gary Ingman, represented the seven EPA Region VIII states on the National Water Quality Monitoring Council from 1997-2001. During his tenure with this group, he was privileged to be exposed to the present monitoring state-of-the-art and the many alternative approaches to water quality monitoring. The Council developed numerous guidance materials and outreach programs for strengthening monitoring through goal-oriented design, effective information strategies, institutional collaboration, methods standardization, improved data management and accessibility, and increased public awareness. Paul Callahan was a member of the BMP audit teams while with the DRNC. He helped develop grazing and forestry monitoring guidelines for the *State Forest Land Management Plan*, covering all DNRC land in Montana.

Figure 1d shows the organizational structure for this service area. Similar to the monitoring for other technical service areas, PBS&J can make use of our team of technicians to conduct routine sampling. Our geographic coverage and mix of skills will allow for the most cost effective approach to monitoring and assessment. To ensure data quality we will implement a rigorous quality assurance/quality control program that involves annual training and oversight by senior-level professionals. Training for specific reference streams sampling protocols will be conducted by monitoring specialists Gary Ingman (biology and water chemistry), Paul Callahan (sediment and geomorphology), Jeff Berglund (riparian and wetlands) and Ken Knudson (fish and aquatic habitat). Gary Ingman will serve as team leader, technical coordinator and agency liaison for purposes of effectiveness monitoring activities. Paul Callahan will be the lead on monitoring of forestry, agricultural and other non-point producing activities. Michelle Arthur and Roland Redmond will assist with development of innovative effectiveness monitoring approaches that rely on GIS and remote sensing applications.

Figure 1d. Organizational Structure for TMDL Effectiveness Monitoring



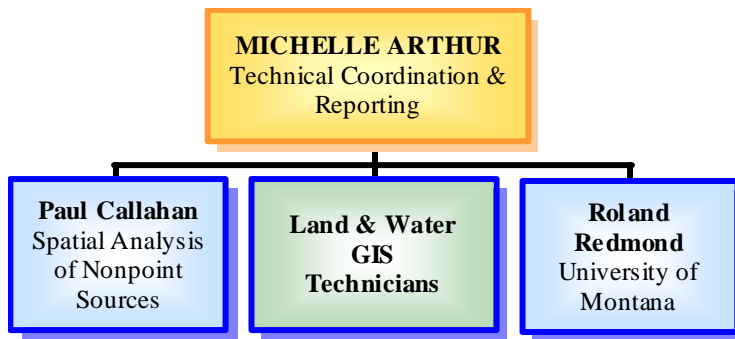
4.10 Geographic Information Systems (GIS) Services

PBS&J's GIS department is located in Missoula. We have a fully functioning GIS lab with three full-time GIS analysts. The PBS&J GIS team has demonstrated a high level of proficiency in the display of complex spatial data using GIS formats. Our GIS analysts work full-time on natural resource projects. Their understanding of data sources and digital image processing is state-of-the-art. Some of our more recent projects include:

- Analysis of watershed conditions on over 750,000 acres on the Bitterroot National Forest in less than three months. Earlier in 2001, the same analysts collaborated with the Helena National Forest to complete watershed analysis portions of the Maudlow-Toston and the Cave Gulch Timber Sales.
- Dasymetric mapping of human population density in western Montana and northern Idaho from the 1990 and 2000 census data. The client was USDA Forest Service, Northern Region. We filtered the numbers of people in each census block with land ownership, land use and topography in 45 counties, and then recalculated density to create a more precise picture of where people live and how the human population in these counties have changed since 1990.
- An automated technique for delineating and characterizing valley-bottom settings. The clients were the USDA Forest Service and the U.S. EPA. The method uses ArcInfo GIS and required three inputs -- a polygon coverage of the area of analysis, an arc coverage of the hydrography, and a grid representing digital elevation. Outputs include a polygon coverage of the valley-bottom delineation, and a grid in which the valley-bottom is segmented according to width and gradient values and classes.

Michelle Arthur will be the technical coordinator for this service area. Michelle is the head of the GIS department at PBS&J, and oversees two other analysts and one technician. Michelle and the other GIS team members have performed complex spatial analyses relating to water quality and watershed condition assessments. The individuals shown in **Figure 1e** are thoroughly familiar with electronic data sources and the natural resources of Montana.

Figure 1e. Organizational Structure for GIS Services

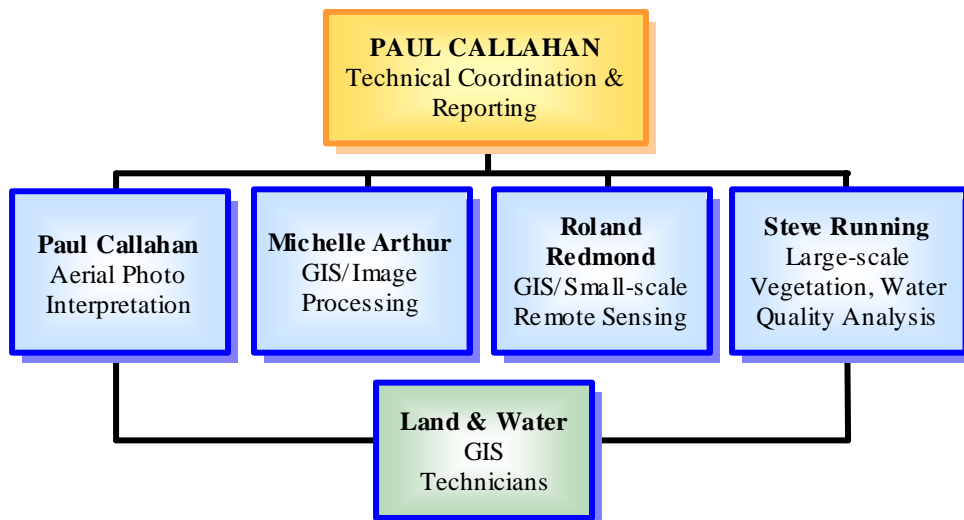


4.11 Remote Sensing

Both new and old technology holds promise for more efficient and cost-effective watershed condition assessments. The PBS&J Team has been assembled to cover all aspects of remote sensing with the intent of providing participating agencies with the maximum range of options. We have specialists in all scales of analysis and in many of the most advanced state-of-the art techniques.

Paul Callahan will be the agency liaison for this service area. We have assembled a highly regarded team of remote sensing specialists for this project. We envision that this team will assist in the development of innovative and cost-effective methods to assess and monitor water bodies and watershed conditions. **Figure 1f** shows the individuals to be involved in this technical service area.

Figure 1f. Organizational Structure for Remote Sensing



Our experience completing TMDLs in Montana has taught us that efficient data collection is the only way to meet the tight budget and schedule constraints of the TMDL program. Because of this, air photo interpretation has become a critical tool in most source assessment efforts. PBS&J has extensive experience in the use of photo interpretation to evaluate vegetation, stream channel condition, and land use. In the last year we have purchased state-of-the-art equipment that allows us to perform photo interpretation work in a very cost-effective way.

The PBS&J Team has extensive experience in aerial photo interpretation. Recent work includes vegetation and stream channel condition analysis for over 250,000 acres of the Columbia River Basin under contract with the U.S. Forest Service. Other relevant remote sensing-based project work experience includes:

- Historical chlorophyll *a* analysis in Flathead and Swan lakes. Landsat imagery was utilized to estimate chlorophyll concentrations throughout Flathead and Swan Lakes over a 17-year period.

- A change-detection analysis of land cover and land use in Phillips County, Montana for the U.S. Fish & Wildlife Service and Montana Fish, Wildlife & Parks. This project entailed mapping land cover and land use continuously across the county for each of 1984 and 1999 based on Landsat TM imagery.
- A revised satellite image land cover classification (SILC-3) for central Montana. The client was the USDA Forest Service, Northern Region. The project entailed mapping current land cover from 1998 Landsat TM imagery across central Montana. Forested cover types were further classified according to canopy closure and size class.
- Forest inputs for hydrologic models. The client was the USDA Forest Service, Pacific Northwest Research Station. We developed a leaf-area index classification system from Landsat TM data for input into a hydrologic model developed by Dr. Dennis Lettenmeier.
- PBS&J has utilized remote sensing on several recent TMDL projects including the Cut Bank-Two Medicine TMDL, Dearborn TMDL, and Big Spring Creek TMDL. These have included current and historical aerial photos, infrared and visible color imagery, video and still photos. Data are managed using an ArcView GIS platform.
- PBS&J conducted an aerial assessment of the Dearborn River and TMDL planning area using historic and current aerial photos, and an aerial reconnaissance using a fixed wing aircraft. A record of the flight was recorded on video and still photos. An assessment of riparian vegetation, channel condition/eroding banks, channel classification, road crossings, and point source pollution was completed on a reach by reach basis for more than 50 miles of channel.

Another way that data can be collected easily is with the use of charter plane flights. PBS&J has an in-house commercial pilot for remote sensing tasks. PBS&J hydrologists and water quality specialists have performed channel condition assessment on over 1,000 miles of streams from the air. This method has proven to be thorough and quite efficient in the assessment of source areas over a watershed-scale. Fixed wing flights can be performed for \$100 per hour. With this service we can cover large TMDL areas, far from our base offices.

4.12 Water Quality Modeling

Water quality modeling requires a special mix of expertise and the PBS&J Team features capable and experienced modelers. Our in-house staff have the skills and experience to meet agency modeling needs regardless of the application.

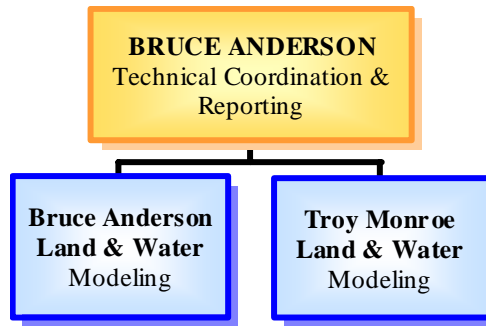
Our team members have created site-specific models to support watershed-based TMDLs.. Our team members have completed nearly two dozen sediment transport and fate modeling projects in eight watersheds throughout the U.S. We are highly regarded by state and federal agencies for our technical expertise in modeling. Our practical engineering approach and experience in water quality issues are combined into a comprehensive yet common sense approach to water quality problem solving. Our experience shows that better solutions are achieved when regulatory agencies and the regulated community agree on the technical tools used to develop alternatives to environmental problems.

The PBS&J Team has worked with numerous hydraulic, water quality and sediment transport models, including:

- **Hydraulics:** HEC-2, DYNHYD, RMA-2, Unet, RivMoD, SWMM, NWS River Forecast System
- **Water Quality:** QUAL2E, QUAL2E-UNCAS, CE-QUAL-W2, WASP, SMPTOX, Multi-SMP, Stella, PULSEQUAL, SWMM, HSPF, BASINS, MINEQL, VIMS Hydrodynamic Ecosystem Model
- **Sediment Transport:** HEC-6, SEDZL, DOSM, Acronym, Meyer-Peter Muller, Akers and White, and others.

The tasks associated with modeling will be coordinated by Bruce Anderson (**Figure 1g**). Bruce will be assisted by Troy Monroe.

Figure 1g. Organizational Structure for Water Quality Modeling



4.13 Statistical Analysis

PBS&J provides complete statistical analysis capabilities for water quality monitoring network design and water quality data analysis.

Effective water quality monitoring involves the design of a complete information system. Rather than simply collecting and analyzing data, water quality monitoring must focus on developing monitoring objectives that provide answers to specific management and regulatory questions. Appropriate data analysis not only enables water quality specialists to make assessments of water quality, but also enables them to make refinements necessary to optimize a monitoring network's ability to produce reliable information. The following design framework employed by PBS&J is broadly applicable to the needs of TMDL and statewide monitoring applications:

- **Data Inventory and Compilation** - compile existing data sources, apply appropriate QA/QC procedures and database management techniques to streamline analyses.
- **Data Analysis** - application of appropriate statistical methods to understand data characteristics and extract info. for design of long-term networks/watershed assessments.
- **Defining Monitoring Expectations** - establishing appropriate watershed management, monitoring and water quality goals, and matching data collection to information products.
- **Statistical Power of Monitoring** - assess the power of the monitoring network to detect trends, evaluate status or quantify loads based on sampling frequency & data characteristics.
- **Monitoring Network Optimization** - optimizing sampling frequency, parameters and station coverage to meet monitoring objectives.
- **Development of Sampling and Analysis Plan** - essential elements of an SAP, including Quality Assurance Project Plan (QAPP) and Standard Operating Procedures (SOPs).
- **Information Reporting Procedures** - turning data into useful information for management needs, including analyses and graphical methods.

PBS&J staffs understand how to evaluate monitoring network design, ensure that monitoring objectives are quantitatively defined, appropriate data are collected, and reliable, cost-effective results are obtained. We have applied this structured approach to design new regional programs and improve existing monitoring networks for large-scale surface water and groundwater networks.

PBS&J has applied an extensive variety of spatial and temporal statistical methods to analyze surface water quality. Our statistical expertise includes the following basic methodologies/approaches:

- Water quality status evaluations (mean/median values with confidence limits, hypothesis testing).
- Water quality trends analysis (time series analysis for trends, both parametric and non-parametric).
- Water quality target compliance (excursion analysis).
- Pollutant loading calculations (flow-stratified sampling, load estimation, USGS methods).
- Spatial comparisons of water quality (e.g. upstream/downstream, paired basins, reference stations vs. impaired water bodies).
- Accounting for flow and seasonal effects (flow adjustment, deseasonalization).

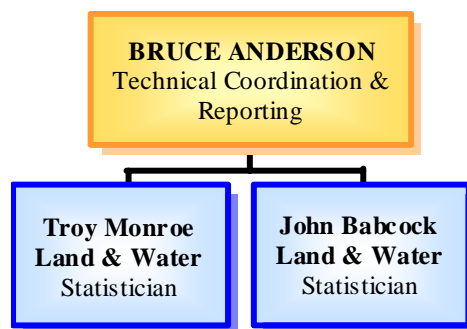
- Evaluating statistical power of the design, monitoring network performance, and defining performance-based criteria.

We are also well versed in more advanced statistical procedures for the analysis of water quality. These methods may find application in TMDL and/or statewide monitoring applications, and include the following:

- Correcting for serial autocorrelation effects, below detection limit data, or non-normal data.
- Using advanced regression techniques to adjust for flow, geology and meteorology effects on water quality.
- Using surrogates (e.g. turbidity) and multiple regression techniques to improve water quality analyses or provide predictive capabilities.
- Geo-spatial data analysis methods using ArcInfo/GIS.
- Classification type analyses (cluster, principle components, etc.) to provide spatial, watershed-scale analyses of watershed/water quality characteristics.

As shown in **Figure 1h**, Bruce Anderson will be the coordinator for the statistical analysis service area. Assisting Bruce will be Troy Monroe and John Babcock. Bruce has been the project manager for the statistical analysis of water quality data for the Clark Fork River and the Madison/Missouri rivers (see **Table 3**). Troy and John have assisted Bruce in these efforts and has extensive experience at water quality statistical analysis.

Figure 1h. Organizational Structure for Statistical Analysis



4.14 Revegetation Services

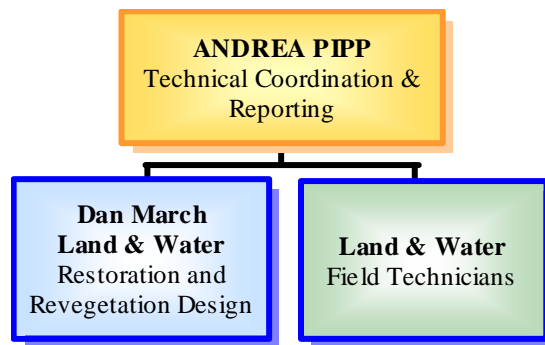
PBS&J staff members have completed dozens of riparian and upland revegetation projects using both in-house staff and subcontractors (on occasion). Our staff botanists oversee planning/design, while staff technicians accomplish the field work and planting. Our revegetation approach emphasizes native plants adapted to the site, and includes containerized or bareroot stock, whole root balls (tree spade), seed collection and planting, hydroseeding, and willow sprigging. We have worked on upland sites, wetland restoration, and riparian planting.

Numerous example revegetation projects are detailed in Table 3 of this proposal, including:

- Rocking K Ranch Rock Creek Riparian Enhancement Project
- Lonestone Wetland Mitigation Project
- Yellowstone Mountain Club Wetland Mitigation
- Kleinschmidt Creek Restoration Project
- Camp Creek Restoration Project
- Harvey Creek Stream and Wetland Restoration Project
- East Fork Bitterroot River
- Murphy Ranch Wetland Restoration
- and many others.

The organizational structure for revegetation services is shown in Figure 1i. Technical coordinators will be Andrea Pipp and Dan March.

Figure 1i. Organizational Structure for Revegetation Services



4.15 Land Use Planning Services

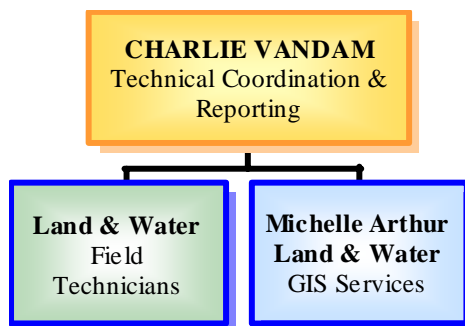
PBS&J has completed technical analysis and developed planning documents for irrigation scheduling and efficiency, integrated crop/pest management, and soil analyses for both private and public entities. We have also developed a number of land use planning assessments following forest fires and for purposes of delineating watershed areas for BMP application.

Example projects are detailed in Table 3 of this proposal, including:

- Frenchtown Irrigation District Water Conservation Plan
- Pioneer Mountain Ranch
- Bitterroot watershed Analysis
- Broadwater County watershed Assessment
- Maudlow-Toston Watershed Analysis
- Cave Gulch Watershed Analysis

The organizational structure for land use planning services is shown in Figure 1j. Technical coordinator will be certified planner Charlie Vandam.

Figure 1j. Organizational Structure for Land Use Planning Services



4.16 Preparation of Technical Manuals or Circulars

PBS&J is experienced with preparation of technical manuals and has completed a variety of work products ranging from simple circulars to multi-chapter guidance documents. Our technical staff is proficient in editing and graphic layout. We can produce materials ready for commercial printing or web distribution using a suite of Adobe publishing software. Example products follow:

Confined Animal Feed Operations BMP Manual - PBS&J developed a guide to Best Management Practices for controlling point and non-point sources of pollution from confined animal feeding operations in Montana. This work included surface and groundwater sampling as well as illustrated plates of BMP techniques. The guide was set in full color pages and 5000 copies were printed.

Montana Stream Permitting Manual - PBS&J developed a comprehensive guide to stream permitting for Montana. This full color, 120-page guide is used as a resource by Conservation District Supervisors to administer the 310 law. Detailed descriptions of hard and soft bioengineering, irrigation diversions, hydraulic structures, and basic stream dynamics are included.

Bitterroot Watershed Guide - We developed many of the graphics and technical illustrations found in the Bitterroot Watershed Guide developed by the Bitterroot Water Forum.

The organizational structure for preparation of manuals and circulars is shown in Figure 1k. Technical coordinator for this service area is Bruce Anderson.

Figure 1k. Organizational Structure for Preparation of Technical Manuals and Circulars

